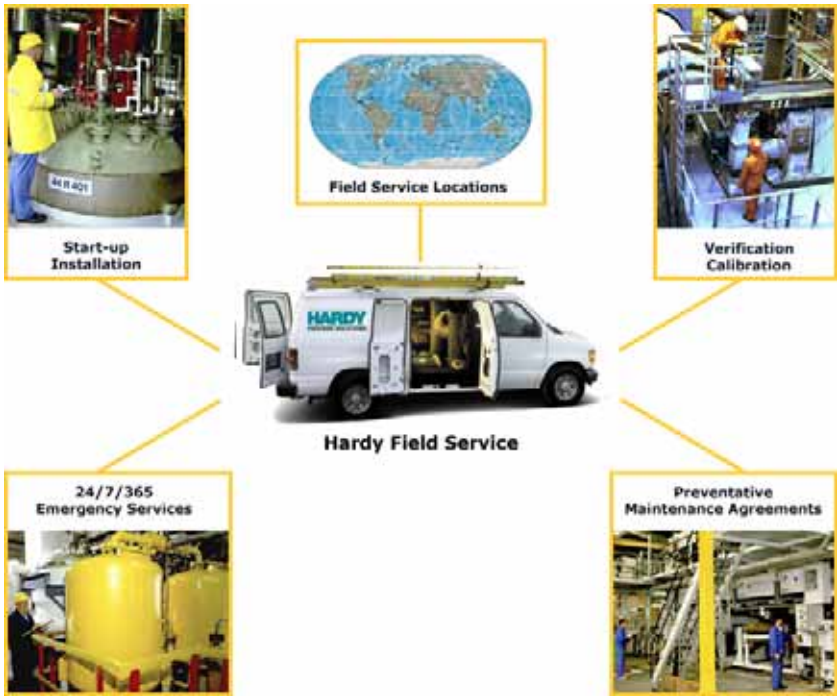
HARDY
PROCESS SOLUTIONS
Measurement ▪ Automation ▪ Productivity

Weight Controller

HI-3030

INSTALLATION AND SERVICE MANUAL



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CHAPTER 1: OVERVIEW

General Introduction to the Hardy HI 3030 Service Manual

This Service Manual provides the Technician with a complete description of installation, setup and troubleshooting procedures for the HI 3030 Weight Controller. To get the maximum service life from this product, technicians should use this instrument in accordance with recommended practices either implied or expressed in this manual. Before using the Weight Controller all service personnel should read and understand all cautions, warnings, and safety procedures, referenced or explicitly stated in this manual, to insure the safe operation and repair of this instrument. Hardy sincerely appreciates your business. We encourage input about the performance and operation of our products from our customers. Should you not understand any information in this manual or experience any problems with this product, please contact our Technical Support Department at:

Phone: (858) 278-2900
FAX: (858) 278-6700
E-Mail:

- hardysupport@hardyinst.com
- hardyinfo@hardyinst.com

Or visit our web site at:

http://www.hardyinst.com

Our web site is full of useful information about our products, process weighing and vibration analysis applications. You can also update the Weight Controller Manual. The latest revised manuals are available FREE in the Support Section of our Web Site. While you're on the site feel free to visit the other web pages which can provide answers to your questions about, load points, process weighing, or other Hardy instruments. Be sure to sign up for the Hardy Newsletter to get the latest information on all Hardy products and services. For answers to technical issues and service problems check the Hardy Web Tech on our Hardy Web Site. Most problems can be resolved by the Hardy Web Tech, 365 days a year, 24 hours a day 7 days a week. You can still contact a technician by phone during our operating hours if necessary.

There are several processes that are the same for each of the HI 3000 Series instruments. If you do not find the process you are looking for in this manual it is located in the HI 3000 User's Guide. Please check there for Communication, Network, installation and setup procedures.

Description

The Hardy Weight Controller controller is part of a complete line of application specific process weighing and condition monitoring instruments. The Weight Controller instrument is available as an HI 3030, a stand alone controller with a display (4 lines; 20 characters) and key pad or an HI 3030R, blind remote stand-alone controller, swivel mounted with no display.

The HI 3030 Weight Controller is a flexible, world-class weight controller that can monitor and control up to four scales simultaneously. In addition to the control functions, the HI 3030 can function as a front end to a PLC, PC or DCS system for applications such as leveling, batching, filling, dispensing, check weighing or as a stand alone weigh controller or weight monitor. The HI 3030 Weight Controller contains Hardy Instrument's core features:

- WAVERSAVER® - Eliminates the effects of vibration on the scale.
- C2® Electronic Calibration - Calibration without test weights.
- SMM (Secure Memory Module) - Memory for manual transfer of configuration data to another HI 3030 instrument(s).

All of Hardy's 3000 Series instrumentation is loaded with standard features like a selectable 10/100 BaseT Ethernet port and an embedded web server to link performance diagnostics and setup data to and from your local Intranet, Extranet, VPN or via the Internet (World Wide Web). An optional Devicenet interface allows multiple applications to be viewed and controlled from one display and allows 3rd party I/O to be easily added to the system. Mapped I/O saves you wiring costs by distributing the I/O where you need it at the process or in the control room. The controllers act as "Masters" over optional Devicenet communications and interfaces for Allen-Bradley Remote I/O, Profibus, ControlNet and Analog provide communications to PLC® and DCS systems.

NOTE: PLC® is a registered trademark of the Allen-Bradley Corporation.

The HI 3030's INTEGRATED TECHNICIAN™, in conjunction with an IT Junction Box, provides built-in system diagnostics that allow you to troubleshoot and diagnose your weighing system right from the front panel or from your Web Site. INTEGRATED TECHNICIAN enables you to read individual load sensor voltages and weights, make comparisons, and isolate individual system components for quick and easy troubleshooting.

NOTE: INTEGRATED TECHNICIAN® is a registered trademark of Hardy Instruments.

Typical Applications

- Filling a Vessel Using a Feeder - Filling is the adding (gain-in-weight) of a material into a container on a scale. (See Fig. 1-1)
- Sequential Batch Control - A gain-in-weight application where multiple ingredients are added one at a time into a single weight hopper. (See Fig. 1-2)
- Level Monitoring - Maintaining material levels in various vessels. (See Fig. 1-3)
- Dispensing A Vessel - Dispensing is the adding of a material by (loss-in-weight) from a vessel on a scale to a container which is off the scale. (See Fig. 1-4)
- Check Weighing - Comparing a weight against limits to determine if the weight is within preset limits.
- Weight Control or weight monitoring.

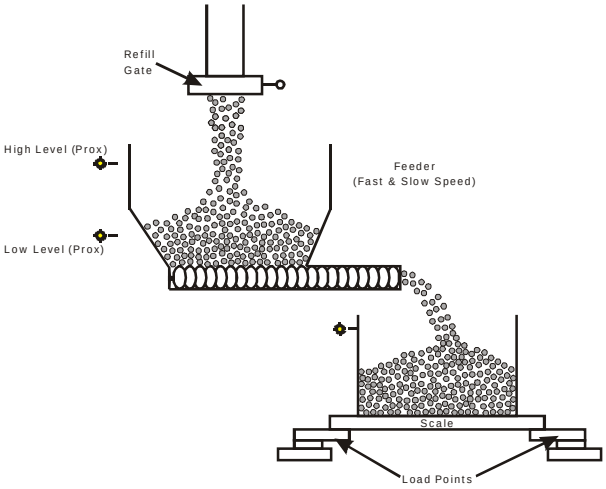


FIG. 1-1 FILLING A VESSEL USING A FEEDER

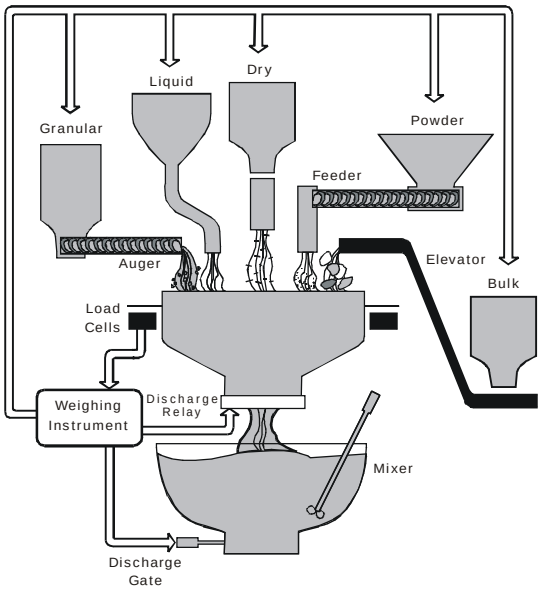


FIG. 1-2 SEQUENTIAL BATCH CONTROL

FIG. 1-3 LEVEL MONITORING

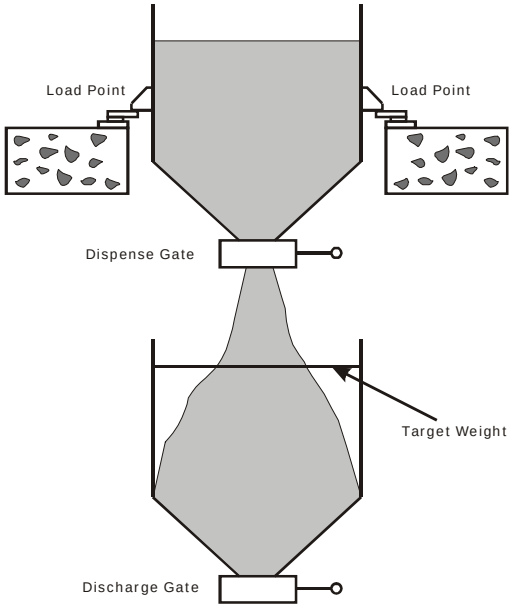


FIG. 1-4 DISPENSING (LOSS-IN-WEIGHT) FROM A VESSEL TO ANOTHER VESSEL

Hardy Web Tech

We have implemented Hardy Web Tech, our Online Tech Support Knowledge Base, to serve your tech support needs better than ever before. Hardy Web Tech helps you immediately find answers to your technical questions. Just type in your question and see if your answer exists in our knowledgebase, which is populated by interactions with customers like you.

You can also create your personalized support page, and your own support section that you can access 24/7. You can even view and update your entire call history, as well as maintain your profile containing your product and system information, so we can more effectively meet your needs.

Last, but not least, we invite all user feedback. Click on the "Provide Feedback" link to let us know how we're doing! What do you like about the product? What's missing? How do you like our new support site? Anything! Your comments are important and will help us shape the future direction of our products.

Connectivity

All HI 3000 Series products enable the user to use the selectable 10/100 base T Ethernet port or use its embedded web server to link (Hardy Control-Link Network) performance, diagnostics and setup data to and from your intranet, extranet, VPN or the internet. Receive alarms via e-mail or over WAP enabled devices including cellular phones and PDAs. A DeviceNet interface allows multiple applications to be viewed and controlled from a display and additional 3rd party I/O to be easily added to the weigh process control system. The controller has a single RS-232 serial port configured as a printer port.

Mapped I/O

Mapped I/O saves wiring costs by distributing the I/O where you need it, at the process or in the control room. The controller is a DeviceNet Scanner and the DeviceNet Scan table is configured using RS NetWorx®. Optional interfaces for Allen-Bradley Remote I/O, Profibus and Analog provide communications to PLC and DCS systems. For Installation and Configuration instructions for Ethernet, Remote I/O, DeviceNet and ControlNet, please refer to the HI 3000 Operation and Installation Manual, Communications/Cabling/ Network Chapters.

WAVERSAVER®

Typically, mechanical noise (from other machinery in a plant environment) is present in forces larger than the weight forces trying to be detected. The HI 3030 is fitted with WAVERSAVER® technology which eliminates the effects of vibratory forces present in all industrial weight control and measurement applications. By eliminating the factor of vibratory forces the controller is capable of identifying the actual weight data. WAVERSAVER® can be configured from the front panel to ignore noise with frequencies as low as 0.25 Hz. One of four higher additional cut off frequencies may be selected to provide a faster instrument response time. The default factory configuration is 0.50 Hz vibration frequency immunity.

C2® Calibration

C2® Second Generation Calibration enables a scale system to be calibrated electronically without using certified test weights which equals the systems load capacity. A C2 weighing system consists of up to eight load sensors, a junction box, interconnect cable and an instrument with C2 capabilities, such as the Weight Controller. All Hardy Instruments C2 certified load sensors contain digital information detailing its unique performance characteristics. The Hardy Weight Controller reads the performance characteristics of each individual load sensor and detects the quantity of

load sensors in the system. Calibration is performed by simply adding a reference point from the front panelor via the Web Server. The reference can be zero (no weight on the scale) or alternatively, a known weight on the scale. The instrument is capable of performing traditional calibration such as with the use of certified test weights.

NOTE: WAVERSAVER® , C2® , and IT® are registered trademarks of Hardy Instruments Inc.

INTEGRATED TECHNICIAN™ (IT®)

The HI 3030 has a built in diagnostics utility which enables the operator to rapidly troubleshoot a weighing system from the front panel of the controller or via the Web Browser. Simply press the Test/9 button and scroll through several tests that will furnish the current state of each of the parameters that concern your application and the weigh system. Help is just a click away in the event you should not understand the information on the display or need a description of the parameter.

Secure Memory Module (SMM)

The Secure Memory Module stores critical configuration (up to 12 material configurations), calibration and setup data of the HI 3030 Weight Controller, thereby protecting this information from corruption. During system operation when a new parameter is entered, the SMM automatically updates the value in its memory. Data stored in one HI 3030 can be restored in another HI 3030 by physically transferring the SMM to the new instrument. The SMM is conveniently accessible from the instruments rear panel.

Serial Port

One standard RS 232 serial port which can be configured to transmit weight data to a serial printer. Baud rates are user selectable at 600, 1200, 2400, 4800, 9600 or 19,200.

NIST/NTEP Option (-NTEP)

The HI 3030 is approved for National Institute of Standards and Technology (NIST) applications formally called the National Bureau of Standards (NBS), and certified under the National Type Evaluation Program (NTEP) for up to 10,000 counts when the NIST mode is activated. This option is required when products are to be directly sold based on weight readings of the scale. For price, availability and installation instructions, please contact your local Hardy Representative or the Hardy Instruments Service Center.

NOTE: The NTEP Option requires HI 3030 Firmware version 2.8.00.00 or above.

-CWM

The HI 3030 is approved for Measurement Canada, Canada Weights and Measures Class III / III HD (3000 d). This option is required when products are to be directly sold based on weight readings of the scale. It is not available on the blind remote version.

Mounting Options

- **-PM** Panel Mount includes mounting frame and Gasket.
- **-SA** Stand alone which includes keyboard and 4x20 LCD display.
- **-MB** Swivel mounted which includes bracket and hardware.

Power Supply Options

- **-AC** 120/240 VAC with NO Output relays
- **-AA** 120/240 VAC with AC Output Relays
- **-AD** 120/240 VAC with DC Output Relays
- **-DA** 12-24 VDC with AC Output Relays
- **-DD** 12-24 VDC with DC Output Relays
- **-DC** 12-24 VDC with DC NO Output Relays

Sensor Input Options

- **-LC** Single Scale Single Load Cell or Summed Load Cell Input
- **-2S** Dual Scale Input
- **-4S** Four Scale Input
- **-JB** Four Load Cell Input (Single Scale) - Enables the instrument to sum four load sensor inputs to act as a built-in summing box.

Rate of Change Option

The ROC option measures and displays the rate at which a material enters or is dispensed from the scale over a period of time. To develop ROC data, a register is used that is 21 entries in length. New weight values are written to the register at the rate of 1/20th of the time base. The first register is subtracted from the 21st Register. The 21st register is one time base older than the 1st register. The time frame can be set to units per second, minute or hour. A time base of discrete values is selectable from 1 to 1800.

Peripherals/System Components

C2 Cable

- C2 Certified Load Cell Cable

ADVANTAGE® Load Points

- Refer to the Hardy Instruments Load Point Selection Guide.

Platform and Floor Scale Bases

- Refer to the Hardy Instruments Load Point Selection Guide.

HI 215JB Series Junction Boxes

- Refer to the Hardy Instruments Load Point Selection Guide.

HI 215IT Series Junction Boxes

- Refer to the Hardy Instruments Load Point Selection Guide.

ACCESSORIES

HI 3000-RC (NEMA 4/4X Rear Cap)

Rear cap for the HI 3000 Series controllers. Upgrades the entire assembly to a NEMA 4/4X rating by enclosing all the rear panel connectors. Includes 2 cable grips.

HI 3000-MB

Swivel mount, includes bracket and hardware.

HI 3000-GF

Front gasket for the panel mount.

HI 3000-CD

Replacement or Additional CD's.

HI 3000-TM

Technical Manual (printed).

HI 3000-OM

Operators Manual (printed).

Communication Options

NOTE: For Installation, Configuration and Setup please refer to the HI 3000 Operation and Installation Manual, Cabling and Networks Sections.

DeviceNet

The DeviceNet Network is an open, global industry-standard communication network designed to provide an interface through a single cable from a programmable controller or PC directly to all HI 3000 Series instruments as well as smart devices such as sensors, push buttons, motor starters, simple operator interfaces, drives and other weigh modules.

EtherNet/IP™

EtherNet/IP, short for **E**thernet **I**ndustrial **P**rotocol, is an open industrial networking standard that takes advantage of commercial, off-the-shelf Ethernet communication chips and media. Ethernet technology, enables the user to access device-level data from the Internet.The Ethernet/IP networking standard supports both implicit messaging (real-time I/O messaging) and explicit messaging (message exchange). EtherNet/IP is an open network that takes advantage of commercial technology that already exists.
TCP/IP is the transport and network layer protocol of the Internet and is commonly linked with all Ethernet installations and the business world. TCP/IP provides a set of services that any two devices can use to share data. Because Ethernet technology and standard protocol suites such as TCP/IP have been published for public use, standardized software tools and physical media have been mass-produced and are readily available, offering you the benefits of known technology and accessibility. The UDP/IP (User Datagram Protocol) is also used in conjunction with the Ethernet network. UDP/IP provides fast, efficient data transport required for real-time data exchange.

Analog Output (-4AN)

The Analog Output Option enables the transmission of Gross, Net, or Total weight as 0-5 VDC, 0-10 VDC, 0-20 mA or 4-20 mA (or the reverse of these), and makes it possible to span these ranges over a portion of the weight data. Two analog option boards can be installed in each instrument. both voltage and current data are available simultaneously.

MOD-Bus/TPC/IP

TCP/IP is the common transport protocol of the Internet and is actually a set of layered protocols, providing a reliable data transport mechanism between machines. Ethernet has become the de facto standard of corporate enterprise systems and it has also become the de facto standard for factory networking. Ethernet has matured to the point that the cost of implementing this network solution has been dropping to where its cost is commensurate with those of today's fieldbuses. Using Ethernet TCP/IP in the factory allows true integration with the corporate Intranet and MES systems that support your factory.

OPC

OLE for Process Control (OPC) enables an HI 3000 module to communicate with any device that supports OLE/COM. The architecture is designed to utilize the Microsoft distributed OLE technology (DCOM) to facilitate clients interfacing to remote servers.

Remote I/O (RIO) Interface to the Allen Bradley Network

The RIO port allows bi-directional communications with Allen-Bradley Programmable Logic Controllers (PLC) and Small Logic Controllers (SLC). The HI 3010 represents a selectable 1/4, 1/2, 3/4 or full rack of discrete I/O (32 bits in the Logic Controllers output and input image files) to the PLC Controller and supports both discrete and block transfers of data. It can support up to 230.4 Kbaud transfer rates.

ControlNet Option

ControlNet is an open network protocol used in industrial automation applications for linking an HI 4050 to any ControlNet-capable device (such as PLCs)Profibus

Allows bi-directional communications to Profibus (Process Fieldbus) products including those made by Siemens, GE Fanuc and Texas Instruments. This interface supports PROFIBUS-DP (Decentralized Periphery) and processes both Selectable Predetermined and Block transfer commands. It supports up to 12 Mbaud transfer rates.

Analog Output (2AN)

The–2AN option provides two independent Analog Outputs per option card which can be configured from the front panel or the embedded web server. This option allows the transmission of Gross, Net, Optional ROC or “mapped” Total weight as 0-5V, 0-10V and 0-20mA or 4-20mA (or the reverse of these) simultaneous, and makes it possible to span these ranges over a portion of the weight data. All parameters can be mapped to these Analog outputs. All the outputs can be assigned (mapped) to one channel or spread over multiple channels all independent of each other.

You can install up to two –2AN options in one controller. When you install two –2AN options, the only other available communication option is DeviceNet, which does not use an option slot. A single –2AN option can be combined with any of the other available network interface which takes up an option slot.

NOTE: When you install the RIO or ControlNet communication options, you must install the Analog 2AN option card in the lower Option Slot.

CHAPTER 2: SPECIFICATIONS

About Chapter 2

Chapter 2 lists the specifications for the HI 3030 Weight Controller. Specifications are listed for the standard instrument and for instruments fitted with optional equipment. The specifications listed are designed to assist in the installation, operation and troubleshooting of the instrument. Service personnel should be familiar with this section before attempting an installation or repair of the instrument.

Specifications for a Standard Instrument

Number of Channels:

- 4 Channels

Update Rate:

- 55 updates per second

Resolution:

- Displayed: 1:985,000 (3 mV/V load cells)
- Internal 1:1,048,5761

Excitation Voltage:

- 5 VDC
- Drives up to 16 350 ohm load cells

Averages:

- 1 to 250 - Sliding, User Selectable in Single Unit Increments

Input:

- Up to sixteen (16) 350 ohm Full Wheatstone Bridge, Strain Gauge Load Sensors/ Cells (5 volt excitation) on one vessel.
- Signal Voltage Range 0-120 mV/V (± 600 millivolts.
- Up to 4 LVDT Load Sensors, (1 load sensor per channel)

WARNING: BECAUSE THE LVDT LOAD SENSORS ARE A VOLTAGE SOURCE, ONLY USE 1 LOAD SENSOR PER CHANNEL. NOT TO DO SO MAY CAUSE PROPERTY DAMAGE AND/ OR PERSONAL INJURY.

CAUTION: LVDT LOAD SENSORS ARE NOT RATED FOR WASHDOWN APPLICATIONS. THE LOAD SENSORS ARE NOT HERMETICALLY SEALED AND WILL LEAK CAUSING INCORRECT WEIGHT READINGS AND INTERNAL CORROSION OF THE COILS.

Non-Linearity:

- 0.0015% of Full Scale

Display:

- 4 line x 20 character backlit LCD
- 5 x 7 dot matrix

Display Increments (Graduations):

- 1,2,5,10,20,50,100,200,500, 1000 user selectable
- Corresponding weight is dependent on the decimal point location.

Standard Opto 22 Electronic AC Relays:

- Switch Voltage: 24-240 VAC
- Wire Size: 12 AWG Maximum
- Maximum Switch Current: .5 Amps
- Single Cycle Surge: 85 Amps (Peak)

Standard Opto 22 Electronic DC Relays:

- Switch Voltage: 5-60 VDC
- Wire Size: 12 AWG Maximum
- Maximum Switch Current: .5 Amps
- 1 second surge: 5 Amps

WAVERSAVER®:

- OFF
- 7.5 Hz
- 3.5 Hz
- 1.0 Hz
- 0.5 Hz
- 0.25 Hz

Calibration Techniques:

- C2® - Second Generation: Electronic
- Traditional - Calibration with test weights

Standard Interfaces:

- Ethernet - 10/100 Base T; embedded server
- DeviceNet - Master Scanner
- ControlNet - Master Scanner
- Profibus - Master Scanner
- Serial RS 232 - simplex to Printer.

Power and Utility Requirements:

Voltage - Universal Power Supply (50/60 Hz)

- 120-240 VAC ± 10%
- 12 - 24 VDC

Frequency

- 47-63 Hz

Total Power:

- 25 Watts maximum with options

Watts available for DeviceNet Power:

- 15 Watts

Common Mode Voltage Range

- ± 2.5 VDC

Common Mode Rejection:

- 100dB @ 50-60Hz

Environmental Requirements:

Operating Temperature Range:

- -10º to 50º C (14º to 122º F)

Storage Temperature Range:

- -20º to70º C (-4º to 158º F)

Temperature Coefficient:

- Less than 0.005% of full scale per degree C for zero and span.

Humidity Range:

- 0-90% (non-condensing)

Approvals:

- CE
- UL
- CUL
- NTEP
- CWM

Instrument Local I/O:

- 5 mappable inputs optically isolated
- 4 mappable outputs 48-240 VAC Opto 22
- 3rd party mappable over DeviceNet, ControlNet, Profibus

Physical Characteristics:

Panel Mount (Model # HI 3030-PM)

Depth

- 8.03" (203.96mm) Back of the Bezel to rear cable clearance.

Case Dimensions

- 6.125"H x 8.56"W x 6.03"D (155.57mmH x 217.42mmW x 1.53.16mmD)

Front Panel Dimensions

- 7.686" H x 9.40" W x 0.625" D (195.22mm H x 247.39mm W x 15.87mmD)

Panel Cutout Dimensions

- 6.75" H x 8.94" W (1775mm H x 227mm W)

Case Material

- GE Cycolac Type KJW - Flame Retardant ABS (Acrylanitrile Butadiene Styrene)

Weight

- 4.6 pounds (2.1 Kilograms)

Rating

- Front Panel NEMA 4 Seal

Wall Mount (HI 3030-MB)

Base Dimensions

- 9.3” L x 4.0” W (236.22mm L x 101.60mm W)

Overall Height with HI 3030 installed, as measured from the base to the top of the front plate.

- 11.77” High (298.96mm H)

Swivel Material

- 304 Stainless Steel

Specifications for I/O Option Boards

Profibus Option Board

Power Supply:

- +5V max - 350mA

Operating Temperature:

- 0 - 70° C (32 - 158° F)

Profibus Services:

- DP Services

ID Number and GSD Support:

- 1003H with Standard GSD File (May change if required)

Input Size:

- 0-122 Words

Output Size:

- 0-122 Words

Combined Input and Output Size:

- Not exceed 208 Words

ControlNet Option Board

Power Supply:

- +5V max - 350mA

Operating Temperature:

- 0 - 70° C (32° - 158°F)

ControlNet Baud Rate:

- 5 Mbit/second

Max I/O Data Capacity:

- Input - 250 bytes
- Output - 250 bytes

ControlNet Supported Features:

- Redundant Media
- Cyclic Messaging

EtherNet/IP™ Option Card

Power Supply:

- +5V max 450mA

Operating Temperature:

- 0 - 70° C (32° - 158° F)

Baud Rate:

- 10/100 Mbit/s

I/O Input:

- 2048 bytes

I/O Output:

- 2048 bytes

Application Interface:

- Parallel

Specification Rel. 2:

- EtherNet/IP level 2 I/O Server CIP (ControlNet & DeviceNet)

Functionality:

- 10/100Mbit MB/TCP +EtherNet/IP + IT functions

Rate of Change Option

- Selectable discrete value - 1 to 1800 seconds
- Time Frame Units - second, minute, hour

CHAPTER 3: INSTALLATION

About Chapter 3

All information contained in Chapter 3 pertains to unpacking, cabling, interconnecting and installing the HI 3030 Weight Controller. Alternatives to any specifications contained or implied in this section are not recommended. It is very important that the user and service personnel be familiar with the procedures contained in this chapter, before installing or operating the HI 3030 Weight Controller.

NOTE: Ethernet and DeviceNet installation and setup instructions are located in the HI 3000 Series Operation and Installation Manual in the Cabling Section. There are also installation instructions in the Quick Installation Guide.

Unpacking

Step 1. Before signing the packing slip, inspect the packing for damage of any kind.
Step 2. Report any damage to the carrier company immediately.
Step 3. Check to see that everything in the package matches the bill of lading. You should normally have:

HI 3030 Panel Mount

- (1) HI 3030 Weight Controller with mating connectors and ordered options installed.
- (1) Mounting Kit with a mounting bracket, gasket and (4) RAF 8-32 captive screws.
- CD containing User Guide and Service Manuals

Step 4. If any items are missing, damaged, or there are any questions, please contact Customer Support at:

Hardy Process Solutions
9440 Carroll Park Drive
San Diego, CA 92121

Phone: (858) 278-2900
FAX: (858) 278-6700
Web Site: http//www.hardysolutions.com
E-Mail: hardysupport@hardysolutions.com

Step 5. Record the model number and serial number of the Weight Controller. Store in a convenient, secure location for reference when contacting Hardy Customer Service Department or to buy parts or firmware upgrades.

Mechanical Installation

Installing the HI 3030 Weight Controller in a Panel

Panel Cutout Specifications

Enclosure Size Requirements:

- Overall depth of the enclosure must be a minimum of 8.5" to allow for the 2" clearance between the rear panel of the HI 3030 Weight Controller and the inside surface of the rear panel of the enclosure. (See Fig. 3-1)
- There must be a 1" clearance completely around the bezel and other installed units.

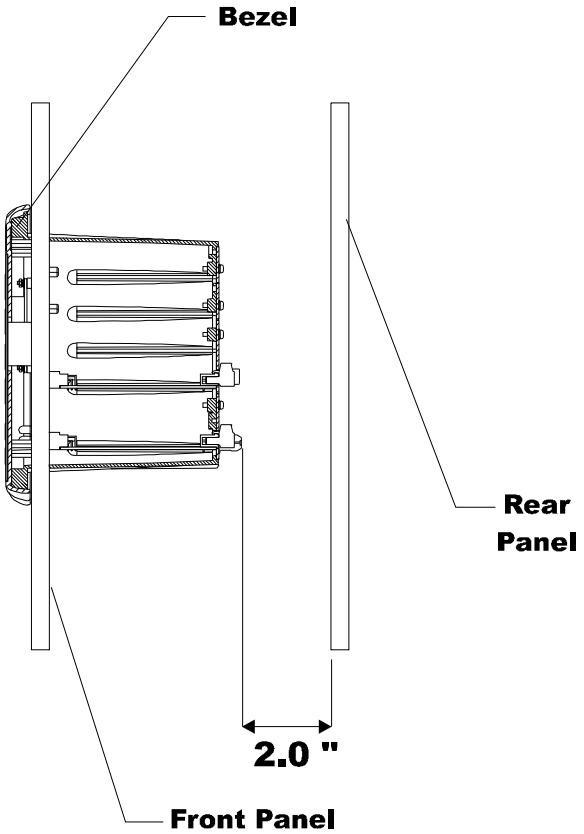


FIG. 3-1 REAR PANEL CLEARANCE REQUIREMENT

Dimensions of the panel cutout. (See Fig. 3-2)

- 8.94” ±.06 (227.076mm ± 1.52mm) Wide
- 6.625” ±.06 (168.26mm ± 1.52mm) High

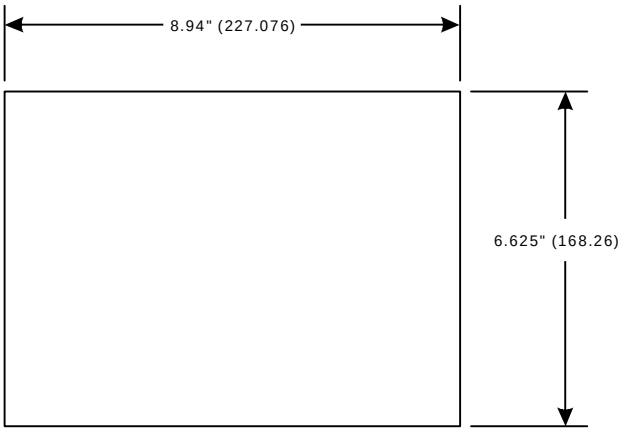


FIG. 3-2 PANEL CUTOUT DIMENSIONS

Installing the HI 3030 Weight Controller

Step 1. Make sure that all Electrostatic Discharge (ESD) precautions are taken before and during installation.

Step 2. The Weight Controller comes with a NEMA 4 & 4X rated compression gasket. Slide the gasket over the rear of the instrument until the gasket is flush with the back side of the front panel. (See Fig. 3-3)

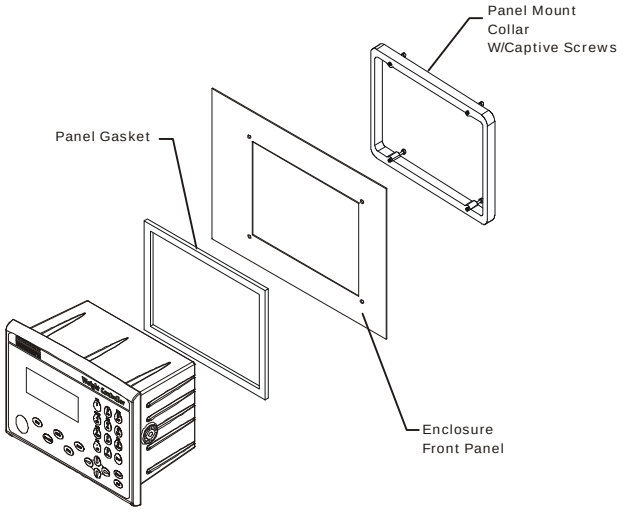


FIG. 3-3 PANEL MOUNT INSTALLATION

Step 3. Gently slide the Weight Controller with the gasket into the cutout in the enclosure front panel or door until the gasket is flush with the enclosure front panel. (See Fig. 3-4) Be sure to secure the instrument with both hands when installing.

Step 4. Line up the instrument's tapped holes with the through holes in the enclosure front panel.

CAUTION: ONCE THE GASKET IS COMPRESSED IT SHOULD NOT BE USED AGAIN. WHENEVER THE WEIGHT CONTROLLER IS REMOVED FROM THE PANEL, RE INSTALL WITH A NEW GASKET.

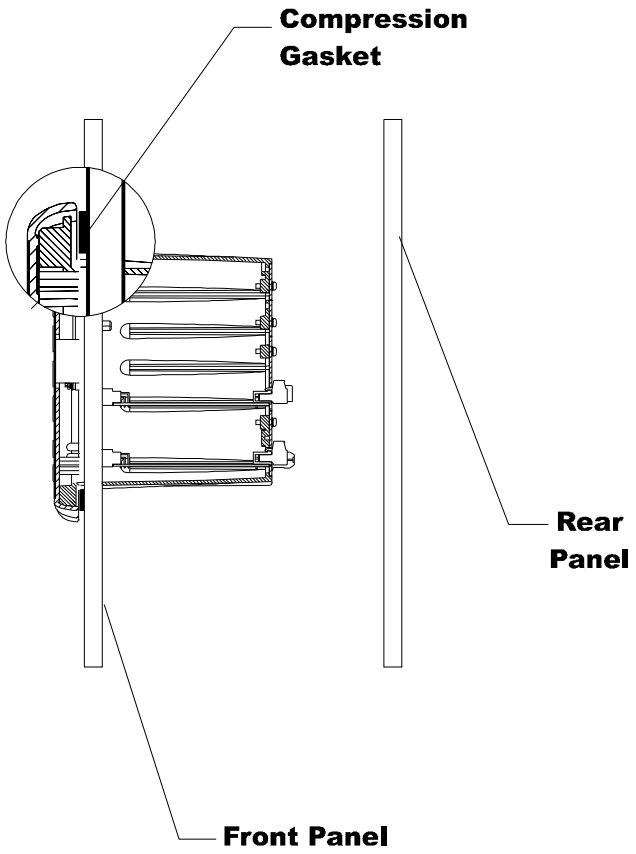


FIG. 3-4 NEMA 4 GASKET FLUSH AGAINST THE FRONT PANEL OF THE ENCLOSURE

Step 5. Gently slide the Panel Mount Collar over the rear of the instrument. (See Fig. 3-3)

Step 6. Push the captive screws through the holes in the Enclosure Front Panel and install the screws into the tapped holes on the instrument until the screws are finger tight.

Step 7. Use a slotted head screwdriver and tighten each screw until the instrument is snug and the compression gasket is tight against the Enclosure Front Panel. DO NOT OVERTIGHTEN!

Step 8. The Panel Mount installation is complete.

Installing the HI 3030 in a Swivel/Wall Mount

About the Swivel/Wall Mount

The swivel mounts allows the Weight Controller to mount on a horizontal or vertical surface. The instrument is mounted in the swivel which is fastened to a hard surface. The mount not only supports the instrument but also allows the Weight Controller to rotate for a better view of the display and more convenient access to the front panel key board. The Swivel Mount also serves as a wall mount. Simply rotate the swivel mount 90 degrees and attach it to a wall. The swivel allows

the instrument to rotate several degrees, even with cables and rear cover attached.

Step 1. Use four (4) 1/4 x 20 hex head bolts to fasten the swivel mount to a horizontal surface. (See Fig. 3-5)

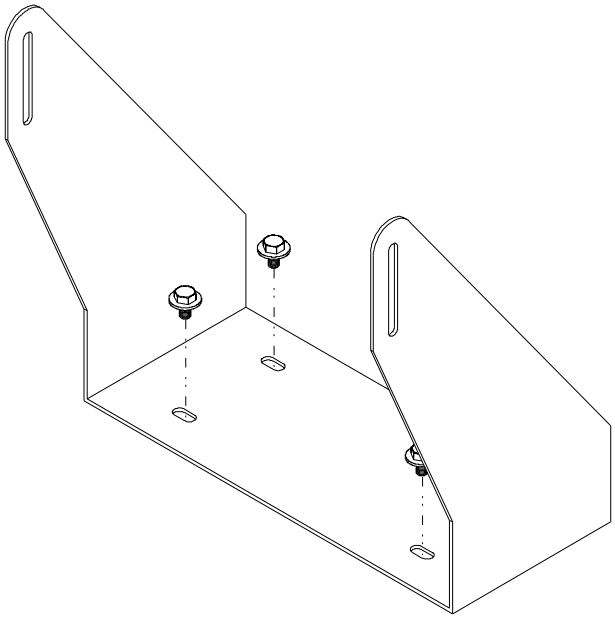


FIG. 3-5 INSTALLING THE SWIVEL MOUNT TO A HORIZONTAL SURFACE

Step 2. Place the Weight Controller between the Swivel Mount brackets so that the threaded holes in the instrument are aligned with the slots in the Swivel bracket. (See Fig. 3-6)

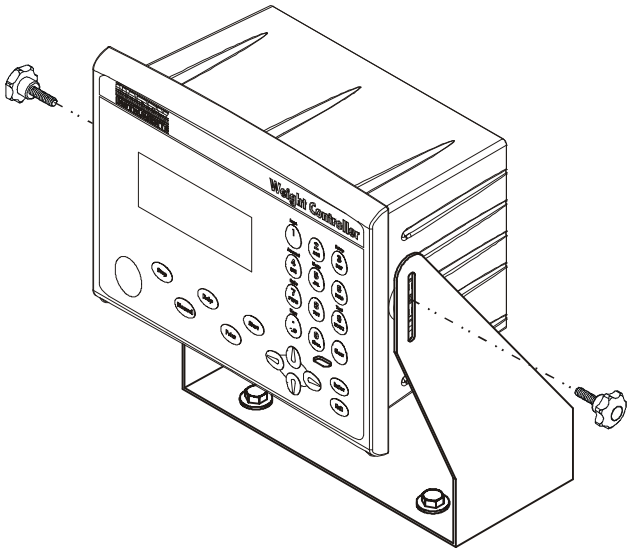


FIG. 3-6 WEIGHT CONTROLLER INSTALLING IN A SWIVEL MOUNT

Step 3. Screw the two (2) fastener knobs into the threaded holes on each side of the Weight Controller until the brackets are snug against the instrument. (See Figs. 3-6 & 3-7)

CAUTION: DO NOT OVERTIGHTEN.

Step 4. To rotate the instrument in the swivel mount, loosen the two fastener knobs.
Step 5. Rotate the instrument to the position you want.
Step 6. Re-tighten the fastener knobs.

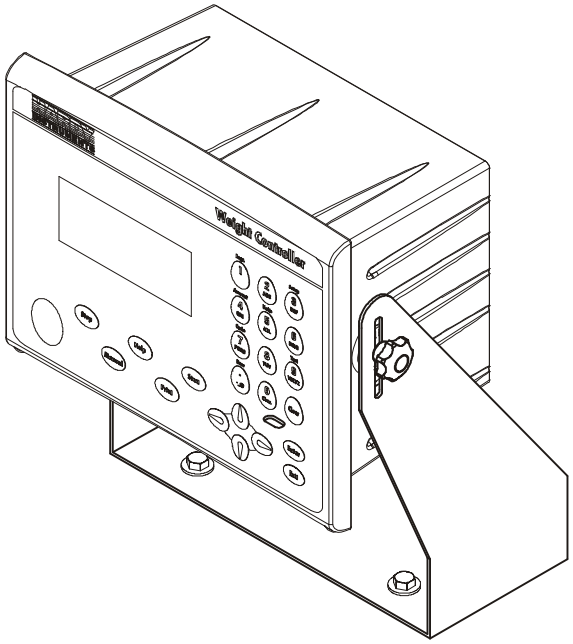


FIG. 3-7 WEIGHT CONTROLLER INSTALLED IN A SWIVEL MOUNT

Step 7. Use four (4) 1/4 x 20 fasteners to fasten the swivel mount to a vertical surface. (See Fig. 3-8)

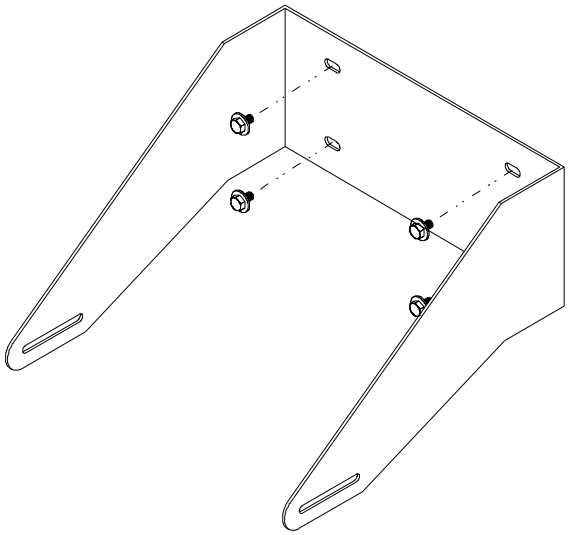


FIG. 3-8 INSTALLING THE SWIVEL MOUNT TO A VERTICAL SURFACE

Step 8. Place the Weight Controller between the Swivel Mount brackets so that the threaded holes in the instrument are aligned with the slots in the Swivel bracket. (See Fig. 3-9)

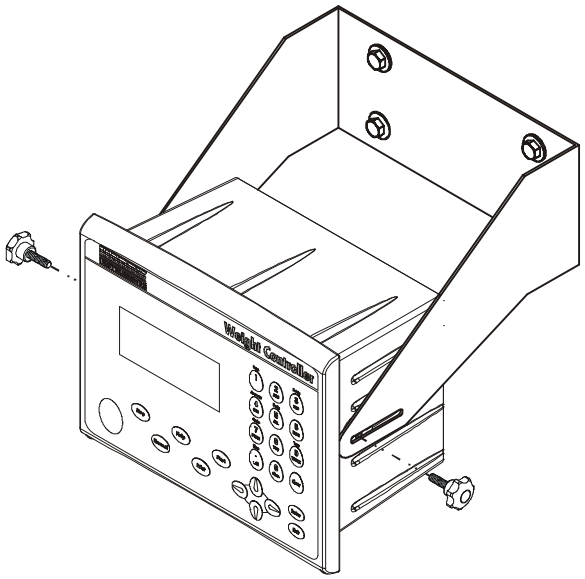


FIG. 3-9 WEIGHT CONTROLLER INSTALLING IN A SWIVEL WALL MOUNT

Step 9. Screw the two fastener knobs into the threaded holes on each side of the Weight Controller until the brackets are snug against the instrument. (See Figs. 3-9 & 3-10)

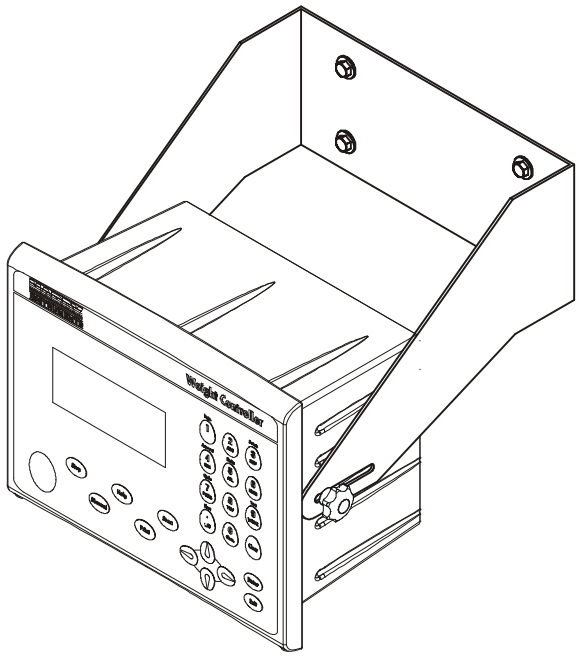


FIG. 3-10 WEIGHT CONTROLLER INSTALLED IN A SWIVEL/WALL MOUNT

Installing Printed Circuit Boards

Step 1. From the back of the instrument, align the PCB board with the housing slots in the instrument so that the backplane connector is facing the instrument. (See Fig. 3-11)

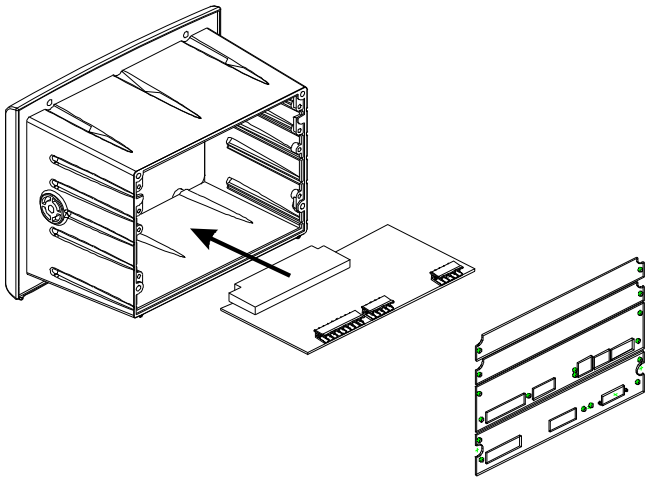


FIG. 3-11 MAIN CONTROLLER BOARD INSTALLATION/LINING UP BOARDS WITH THE SLOTS

Step 2. Gently slide the circuit board into the slots making sure that the each side of the PC board is in the proper slot. (See Fig. 3-12)

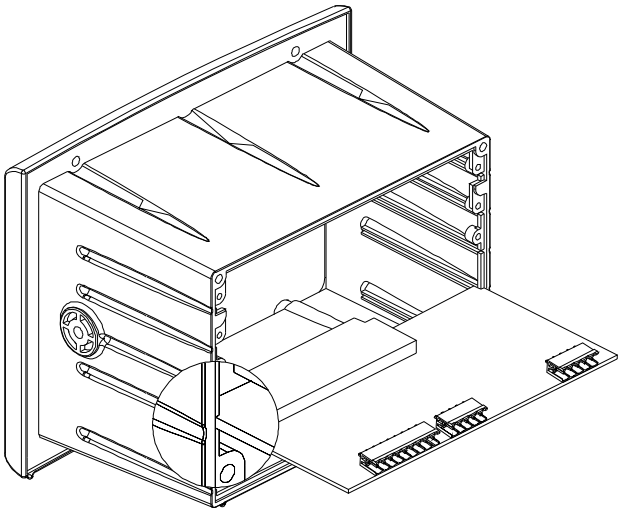


FIG. 3-12 MAIN CONTROLLER BOARD INSTALLATION/SLIDING THE BOARD INTO THE INSTRUMENT

Step 3. Gently push the PC board all the way into the instrument until the backplane connector is connected to the backplane.

Step 4. Install the Main Board rear plate. (See Fig. 3-13)

- Place the Main Board rear plate so that the threaded holes on each side of the instrument chassis are aligned.
- Screw a panhead screw (#4-40) into the threaded hole on the instrument chassis. Do not tighten.
- Screw the panhead screws that attach the rear plate to the Main Board until they are finger tight.
- Use a Phillips head screw driver and tighten all the installed screws until snug.

CAUTION: DO NOT OVERTIGHTEN.

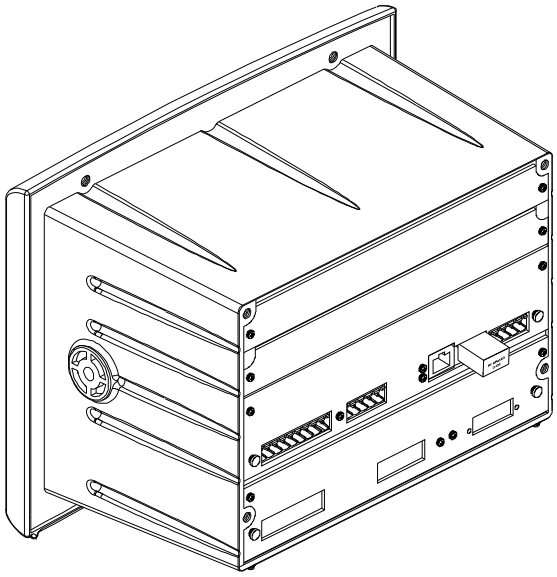


FIG. 3-13 MAIN CONTROLLER BOARD INSTALLED WITH REAR PLATE

Step 5. Installation of all the PC Boards used in any HI 3000 Series Instrument requires the same procedures.

Network Option Card Installation

All Network Option Card installation instructions can be found in the HI 3000 Manual which is located on the Resource CD you received with your HI 3000 Series instrument. If you do not currently have the Resource CD or an HI 3000 manual go to the Hardy Instruments Web Site and download a free copy.

Removing Printed Circuit Boards

Step 1. Unplug all the cables that are connected to the instrument.

Step 2. Use a Phillips head screw driver and remove the two (2) pan head screws that fasten the rear plate to the instrument. You do not need to remove any of the screws that fasten the rear panel to the PC Board.

Step 3. Use your fingers to grasp the two (2) (knurled knobs) that are mounted on the rear panels.

Step 4. Gently pull the knobs away from the instrument until the PC Board is clear of the instrument slots.

Step 5. Store the circuit board in a secure and dry location, free of any ESD.

Electrical Installation

Cabling and Interconnecting

Recommended Installation Procedures

- Carefully plan the cable runs and wiring connections before routing, cutting and trimming cables and wires.

CAUTION: INSTRUMENT POWER AND RELAY WIRES SHOULD BE ROUTED AWAY FROM ALL OTHER SIGNAL CABLES TO AVOID ELECTRICAL INTERFERENCE.

- All cabling should be neatly bundled, tied, and dressed.
- Use a 6 inch service bend to relieve stress on the connectors and to ease servicing the unit.
- Make sure that all plugs are firmly in place.
- Be sure to secure the power cord with the two (2) captive screw-on clips.
- All connections are made at the rear panel of the Weight Controller.

-AC Power Wiring

WARNING: DO NOT OPERATE WITH INCORRECT LINE VOLTAGE. TO DO SO WILL RESULT IN PROPERTY DAMAGE AND/OR PERSONAL INJURY. MAKE SURE THAT THE POWER SOURCE DOES NOT EXCEED 240 VAC.

WARNING: IF A LITHIUM BATTERY IS REPLACED WITH AN INCORRECT TYPE IT MAY CAUSE AN EXPLOSION WHICH WILL CAUSE PROPERTY DAMAGE OR PERSONAL INJURY.

- The AC power should be supplied by a “clean” primary line, directly from the power panel. This line should not supply any other equipment, including the feeding unit, and should be supplied with a minimum 10 amp breaker. (See Fig. 3-14)

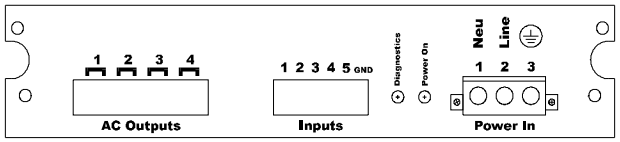


FIG. 3-14 POWER WIRING DIAGRAM

- Power Input J1

  J1-1 Neu (Low)
  J1-2 Line (HI)
  J1-3 Ground

Step 1. The HI 3000 Series instruments are configured with a universal power supply rated from 120 to 240 VAC. The instruments can be powered by a 120 or 240 VAC power source and requires no switching or jumper settings.

Step 2. Install a 3-wire, minimum 14 AWG power line to the 3-pin terminal block connector. (See Fig. 3-14)

Step 3. The power and relay circuit card, filters and conditions AC power. However, for noisy power lines, external conditioning may be required. For more information, consult the HI 3000 Series Installation and Service Manual or contact Hardy Instruments Technical Support.

-DC Power Wiring

WARNING: DO NOT OPERATE WITH INCORRECT LINE VOLTAGE. TO DO SO WILL RESULT IN PROPERTY DAMAGE AND/OR PERSONAL INJURY. MAKE SURE THAT THE POWER SOURCE DOES NOT EXCEED 24 VDC.

- The DC power should be supplied by a “clean” primary line, directly from the DC power source. (See Fig. 3-15)

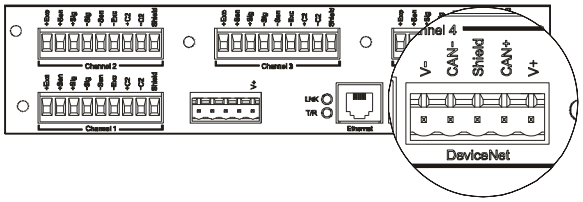


FIG. 3-15 DC POWER SUPPLY CONNECTION

Step 1. Connect your positive and negative DC voltage lines to the Phoenix connector that plugs into the DeviceNet Connector. (See Fig. 3-15)

Step 2. Plug the connector into the DeviceNet Connector at the rear panel.

NOTE: Use DC power source when you have the -DC option and do not have the DeviceNet Option. The DeviceNet option has its own DC power source.

Load Point Connections

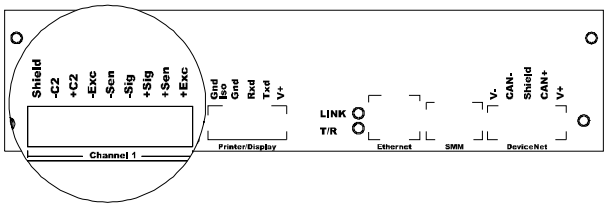


FIG. 3-16 REAR PANEL/LOAD POINT CONNECTIONS

C2® Load Point Connection

WARNING: LOAD CELL CABLE LENGTH HAS BEEN CALCULATED INTO C2 CALIBRATION DATA. HARDY PROCESS SOLUTIONS RECOMMENDS THAT YOU DO NOT CUT YOUR ADVANTAGE OR ADVANTAGE LITE LOAD SENSOR CABLE, AS YOUR C2 ACCURACY WILL BE AFFECTED AND THE WARRANTY WILL BE VOIDED.

Cable color Code for C2 Load Points (left to right facing the rear panel):

- Shield Ground Wire
- C2- Violet
- C2+ Grey
- EXC- Black
- SEN- Brown
- SIG- White
- SIG+ Green
- SEN+ BLUE
- EXC+ RED

Step 1. Remove the factory installed jumper from the terminal block if you are connecting an 8 wire cable from the junction box.

Step 2. Connect the cable (Recommended load cell cable: Hardy Instruments Prt. # 6020-0001) wires to the J9 terminal block according to the cable color chart. (See Fig. 3-16)

NOTE: To purchase Hardy Load Cell cable, contact your local Hardy Representative or Distributor.

Step 3. Plug the terminal block into the Channel 1 connector on the rear panel.

Non-C2 Load Point Connection

Cable color Code for Non-C2 Load Points:

- Shield Ground Wire
- C2- Not Used*
- C2+ Not Used*
- EXC- Black
- SEN- Brown
- SIG- White
- SIG+ Green
- SEN+ Blue
- EXC+ Red

*NOTE: *If you are using an IT Summing Box you need to connect the IT Summing Box Communication to C2- and C2+.*

Step 1. Remove the factory installed jumper from the terminal block if you have 6 wire load cell cable that includes sense wires from the load cell or junction box.

Step 2. Connect the cable (Recommended load cell cable: Hardy Instruments Prt. # 6020-0001) wires to the J9 terminal block according to the Non-C2 cable color chart.

Step 3. Plug the terminal block into the Channel 1 (J9) connector on the rear panel.

LVDT and Half Bridge Load Cells/Sensors

Please contact Hardy Technical Support for installation instructions.

Junction Box Wiring

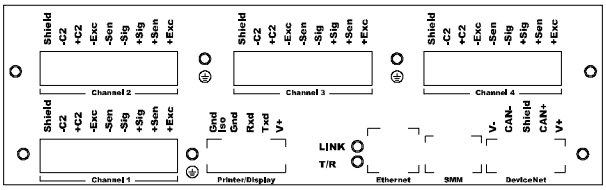


FIG. 3-17 JUNCTION BOX CONNECTIONS

Step 4. Connect the cable wires directly to the terminal blocks according to the C2 or Non-C2 cable color charts.

Step 5. Plug the terminal blocks into Channels 1 thru 4 connectors on the rear panel. Write down which load cell is connected to Channel 1, Channel 2, Channel 3, Channel 4 for future reference.

NOTE: If you have one load point you must plug it into Channel 1. If you have more than one load point you must make sure that you plug one of the load points into Channel 1.

Step 6. If you only have 3 load cells, do not use Channel 4.

Installation of Secure Memory Module (SMM) (See Fig. 3-18)

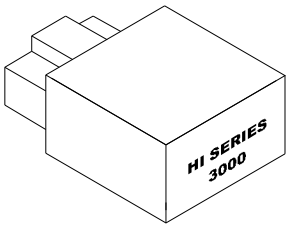


FIG. 3-18 SECURE MEMORY MODULE (SMM)

Step 7. Slide the module with the notch up into the module housing at the rear panel. (See Figs. 3-19 & 20)

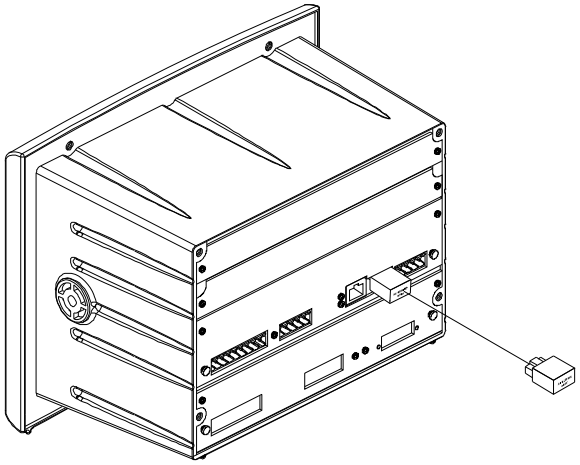


FIG. 3-19 INSTALLING THE SECURE MEMORY MODULE

Step 8. Press the module in until it stops. Do not force the module, it should slide in easily.

Step 9. To remove the module pull the module straight out of the housing. (See Fig. 3-19)

Transferring a Secure Memory Module

NOTE: Make sure that when you move an SMM to another instrument that you know what type of instrument that will receive the SMM. For example if you accidently place a Dispenser into a previously configured Filler, the Filler changes into a Dispenser and vice versa. Make sure that you know the type of instrument the SMM was taken from.

CAUTION: DO NOT REMOVE AN SMM WITH THE POWER ON. ALWAYS DISCONNECT THE POWER CABLE FROM THE INSTRUMENT BEFORE REMOVING OR INSTALLING THE SECURE MEMORY MODULE.

Step 1. Disconnect the power cable from the Instrument.

Step 2. Remove the Secure Memory Module from the instrument.

Step 3. Install the Secure Memory Module into the new instrument.

Step 4. Power up the new instrument.

NTEP Option Installation

NOTE: After installing the NTEP option you can no longer enter negative Tare values.

NOTE: The NTEP Option pertains to the Gross Weight displayed on the Front Panel of the Instrument ONLY.

NOTE: The NTEP Option requires HI 3030 Firmware version 2.8.00.00 or above.

Step 1. Check to see which firmware version is currently installed on your instrument by doing the following:

- From the front panel press the Text/9 button. The Test and Data Menu appears with the cursor in front of the “Device Data List”. (See Fig. 3-20)

```
TEST AND DATA MENU
> Device Data List          -->
  Diagnostics               -->
```

FIG. 3-20 TEST AND DATA MENU/SELECTING DEVICE DATA LIST

- Press the Enter button. The Test Data List appears.
- Press the down arrow button until the cursor is in front of “Version:” The current Firmware version is listed here. (See Fig. 3-21)

```
TEST DATA
  PP# :          0650-0119-01
> Version:       2.7.00.28
  IP:            117.146.125.42
```

FIG. 3-21 TEST DATA/VIEWING VERSION NUMBER

- From the HI 3030 Web Page click on “Operation”. (See Fig. 3-22) The Operation page appears. (See Fig. 3-23)

FIG. 3-22 HI 3030 WEB PAGE/SELECTING OPERATION

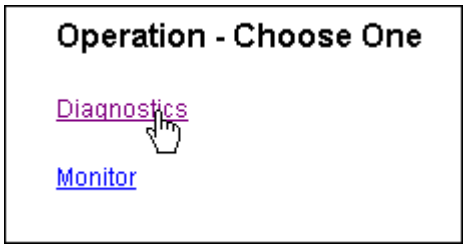


FIG. 3-23 OPERATION PAGE/SELECTING DIAGNOSTICS

- Click on “Diagnostics”. The Operation-Diagnostics page appears. (See Fig. 3-24)

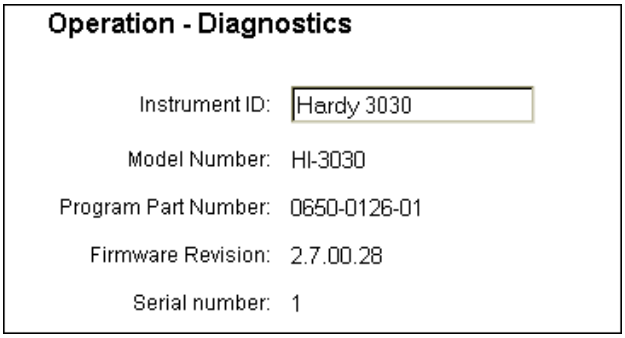


FIG. 3-24 OPERATION - DIAGNOSTICS/FIRMWARE REVISION NUMBER 2.7.00.28

Step 2. Contact your local Hardy Representative or Hardy Instruments Service Center to arrange for the installation of the NTEP option. Installation of the NTEP option requires that the instrument be returned to the factory.

WARNING: ONCE THE NTEP SEAL AND LABEL ARE PLACED ON THE HI 3030 THEY CANNOT BE BROKEN. BREAKING THE NTEP SEAL VOIDS THE NTEP CERTIFICATION.

CHAPTER 4: CONFIGURATION

About Chapter 4

Chapter 4 contains step-by-step instructions for configuring the Hardy Instruments, HI 3030 Weight Controller. The procedures include complete instructions for configuring the Weight Controller from the Front Panel, Remote I/O (optional) ControlNet (optional), DeviceNet (Optional) and Web Browser. We highly recommend reading the procedures before configuring the Weight Controller. Being familiar with the configuration procedures insures that the Controller will provide trouble free service.

Getting Started

Before operating the Hardy HI 3030 Weight Controller, check to make sure the following procedures have been performed:

- Power and Load Point cables properly installed.
- Communication cables properly installed.
- Calibration Performed.

All the features of the Weight Controller operate the same no matter what the interface. First let's get familiar with configuring the HI 3030 from the front panel of the instrument. (See Fig. 4-1)

Help

About Help

As you move through the setup/configuration menus you may on occasion need assistance. If you need help, do the following:

Step 1. Use the up and down arrows to move the cursor in front of the Menu Item you want help on.
Step 2. Click the Help button either on the front Panel and a Help Dialog appears. The help dialog tells you what the Menu Item is used for or other descriptive information to help you enter the right parameters for the current menu item.
Step 3. Push the Exit button to return to the current menu.

Description of the Front Panel

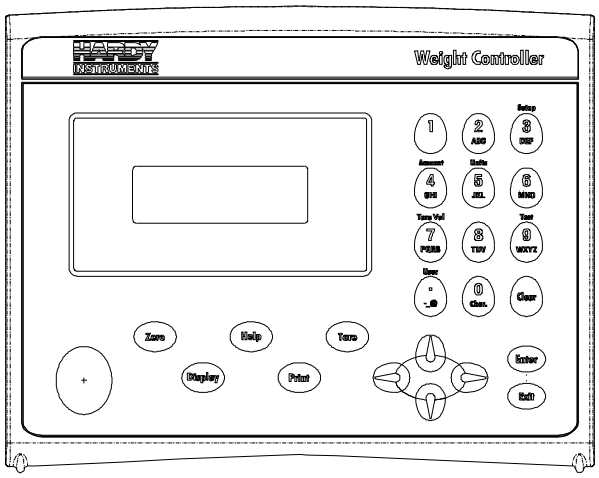


FIG. 4-1 FRONT PANEL

Front Panel Display

The Front Panel Display is a 4 line x 20 Alphanumeric character LCD. The screen displays all the menus for Configuring, Calibrating and Operating the HI 3030 Weight Controller.

Button Functions

Tare Button

Tares the selected scale. The Tare button sets the Tare Weight equal to the Gross Weight and makes the Net Weight equal to 0. When you are in Net Mode (i.e. a channel displays NET in the Summary display, you will see the weight change to 0.00. If you are in Gross mode you will not see anything happen, but the Net weight is changed to 0.00. Press the right or left arrow buttons to verify that the Net weight is 0.00.

Zero Button

Used in Gross mode to zero the selected scale to within the tolerance level.

- This function can be used as many times as desired as long as the total does not exceed the value entered as the zero tolerance.

Help Button

The Help button displays a Help message for the current Menu item (the Menu item in front of the cursor) that is dis-

played. In Standby the Help button does not display a Help message.

Display Button

The Display Button displays the Net, Gross and Tare weights for the scale that is connected to the Channel selected in the Main Menu. There 4 channels total.

Print Button

The Print Button when pressed prints the Gross, Net and Tare weights to an attached printer. If the Rate of Change option is activated the print button prints the ROC as well. If the Scoreboard is activated the Print Button does not function.

Up/Down - Left/Right Buttons

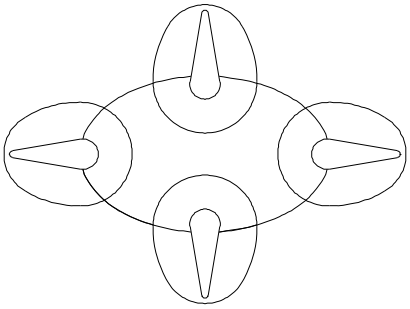


FIG. 4-2 DIRECTIONAL BUTTONS

The Up/Down arrow buttons move the cursor vertically allowing the user to scroll through each item of a menu. The Left/Right arrow buttons move the cursor horizontally left and right. The Left arrow button has an added backspace function. For example if there are Alpha/Numeric characters that appear in the display, as you press the left button it erases the characters. The Right arrow button moves the cursor to the right in the display and does not erase a alphanumeric entry. The Left/Right arrow buttons also move the cursor through a pick list. (See Fig. 4-2)

Enter Button

The Enter button enters the Alpha/Numeric value entered for a menu item in the display. The Enter button also enters the selections from a pick list. (See Fig. 4-3)

```
SETUP MENU          CHANNEL 1
This channel is           ON
> Unit of Measure         kg
  Decimal Point            2
```

FIG. 4-3 LIST SELECTION/ENTER BUTTON

For example, when selecting units from a pick list, use the left and right arrows to move the cursor in front of the unit you want and press the Enter button.

Exit Button

Takes you back to the previous menu.

Clear Button

The Clear button clears the total Alphanumeric Entry and repositions the cursor for the first entry.

1 Button

Enters the integer 1 in a display.

2/ABC Button

Enters the integer 2 in the display. Also enters the characters A, B, C. Pushing the button once enters the integer 2.

NOTE: For numeric entries only: Push the button and the number on the button is entered.

NOTE: For Alphanumeric entries only: Pushing the button once, the first letter on the button is entered in uppercase, A, D, G, and so on. Push the button a second time, the second letter is entered in uppercase, B, E, H, K and so on. Push the button a third time, the third letter is entered in uppercase, C, F, I, L, and so on. Push the button a fourth time, the fourth letter is entered in uppercase, S, Z. Push the button a fifth time the first letter is entered in lowercase, a, d, g, and so on. After you go through the lowercase letters, you can push the button again for the number. You need to push the buttons rapidly. If you delay too long the instrument will accept the alphanumeric character and move the cursor to the left preparing for the next alphanumeric entry. This is true for all the Alphanumeric buttons. If this occurs use the left arrow button to erase the current entry and enter another.

Setup/3/DEF Button

This enables you to access the configuration and setup menus. Also enters the number 3 and the letters D, E, F.

Amount/4/GHI

Enables you to make quick set point changes. Also enters the number 4 and the letters C, H, I.

Units/5/JKL Button

Enables you to change the units of measure (Lbs/Kg/oz/g) while in the standby mode of operation. Also enters the integer 5 and the letters J, K, L.

6/MNO Button

Enters the integer 6 and the letters M, N, O.

Tare Val/7/PQRS Button

Enables you to set the Tare Value. Also enters the integer 7 and letters P, Q, R, S.

NOTE: From Firmware Version 2.8.00.00 and above you can no longer enter negative tare values.

8/TUV Button

Enters the integer 8 and the letters T, U, V.

Test/9/WXYZ Button

Enables you to enter the Self-Test and IT modes. Also enters the inter 9 and letters W, X, Y, Z.

User/./_/@ Button

Enables you to enter or change the 3 digit user code while in the standby mode. Also enters the period (.), underscore (_) and @ symbols.

0/Char. Button

Enters the integer 0 in the display. When you push the button the second time a set of characters appears in the display.

Step 1. Using the up and down arrow buttons move the cursor in front of the character you want to display.
Step 2. Press the Enter Button to select the character.
Step 3. Press the Exit Button to return to the display. The character should now appear next to the cursor.

Starting Up for the First Time

When the HI 3030 Weight Controller powers up after delivery from the factory, a Summary display appears with the correct number of channels for the installed Channel card in your instrument.

Step 1. The First display is the Summary Display with either one, two or four channels (depending on the installed option card) displaying the weight in Gross mode. (See Fig. 4-4, 4-5, 4-6)
Step 2. To change from Gross to Net mode press either the right or left arrow buttons until NET appears.

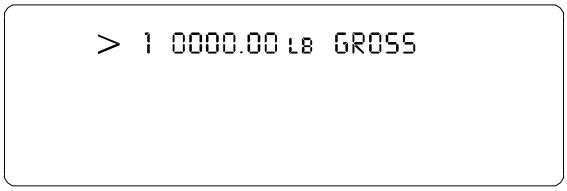


FIG. 4-4 SUMMARY DISPLAY/1 CHANNEL

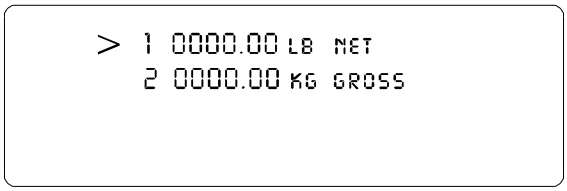


FIG. 4-5 SUMMARY DISPLAY/2 CHANNEL

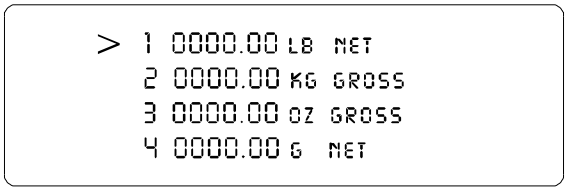


FIG. 4-6 SUMMARY DISPLAY/4 CHANNELS

Step 3. To select a channel, press the up or down buttons to move the cursor in front of the channel you want. (See Fig. 4-7)
Step 4. Press either the Display or the Enter button. The Single Channel display appears for the selected channel.

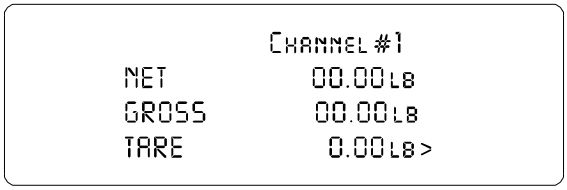


FIG. 4-7 SINGLE CHANNEL SELECTION DISPLAY

Step 5. You will notice an arrow at the end of the TARE line. (See Fig. 4-7)

NOTE: Tare weight must be > 0 and < scale capacity. From Firmware Version 2.8.00.00 and above you can no longer enter negative tare values.

Step 6. To change the Tare Weight, press the Enter button. The Tare menu appears. (See Fig. 4-8)

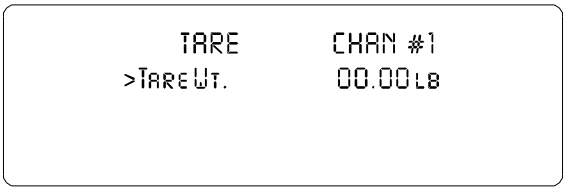


FIG. 4-8 TARE MENU

Step 7. To change the Tare weight:

- Press the Clear button.
- Use the Alpha Numeric pad to enter the new Tare weight.
- Press the Enter button to set the entry.
- A brief “Entry Accepted” displays. (See Fig. 4-9)

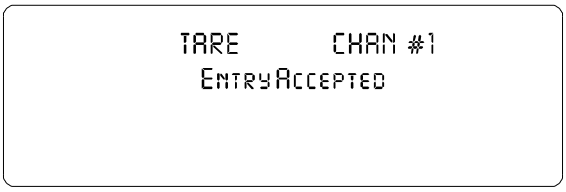


FIG. 4-9 TARE MENU/ENTRY ACCEPTED

Step 8. Press the Exit button to return to the Single Channel Display.

Step 9. Press the Exit button again to return to the Summary Display.

Weight Controller Configuration From the Front Panel

The Weight Controller Configuration process sets up the instrument to operate as a scale. This includes setting WAVERSAVER®, Scale Capacity, Units of Measure, Motion tolerance and other instrument parameters required for your process. Here is where the permanent parameters are entered. All the parameters configured except the communications parameters, (IP Address etc.) are stored in the Secure Memory Module (SMM).

Step 1. Press the up or down arrows until the cursor is in front of the Channel you want to configure. (See Fig. 4-10)

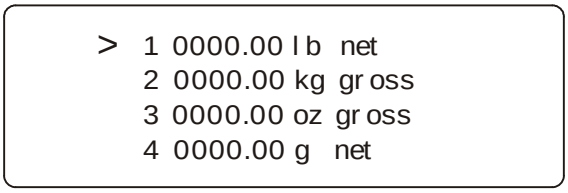


FIG. 4-10 SUMMARY DISPLAY/SELECTING CHANNEL

Step 2. Press the Setup/3 button. The Configuration Menu appears. (See Fig. 4-11)

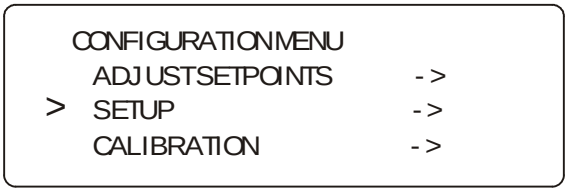


FIG. 4-11 CONFIGURATION MENU/SELECTING SETUP

Step 3. Press the Enter button. The Setup Menu Appears. (See Fig. 4-12)

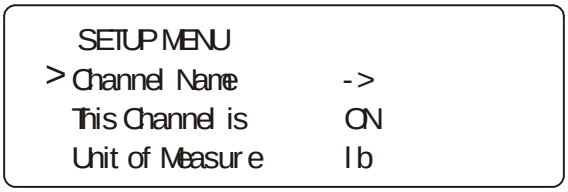


FIG. 4-12 SETUP MENU/SELECTING CHANNEL NAME

Step 4. Press the Enter button. The Channel Name # menu appears. Use the alphanumeric buttons to enter a descriptive name for the channel you selected. (See Fig. 4-13)

PARAMETER:CHANNEL NAME
RANGE: NONE
DEFAULT: CHANNEL #1

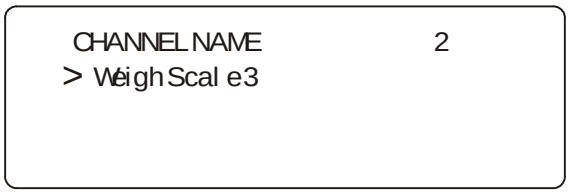


FIG. 4-13 CHANNEL NAME/ENTERING CHANNEL NAME

Step 5. Press the Enter button to save the setting.
Step 6. Press Enter to return to the Setup Menu.
Step 7. Press the down arrow until the cursor is in front of "This Channel is". (See Fig. 4-14)

PARAMETER:THIS CHANNEL IS
RANGE: ON/OFF
DEFAULT: ON

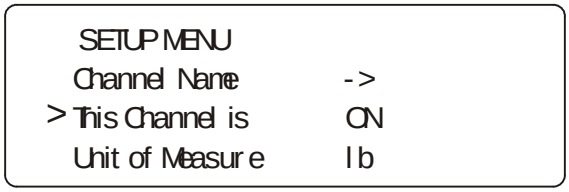


FIG. 4-14 SETUP MENU/TURNING ON A CHANNEL

Step 8. Press the right or left arrow to toggle between ON and OFF.
Step 9. Press the Enter button to save the setting.
Step 10. Press the down arrow until the cursor is in front of Unit of Measure

Unit of Measure Parameters

About Unit of Measure

The Unit of Measure Parameter sets the scale to either English or Metric units. The Selections are:

- Pounds (lb)
- Ounces (oz)
- Kilograms (kg)
- Grams (g)

NOTE: Changing the units of measure converts all parameter settings to the selected units except the Setpoint Values.

PARAMETER:UNIT OF MEASURE
RANGE: LB, KG. OZ, G
DEFAULT: LB

Step 1. Press the down arrow button until the cursor is in front of Unit of Measure. (See Fig. 4-15)

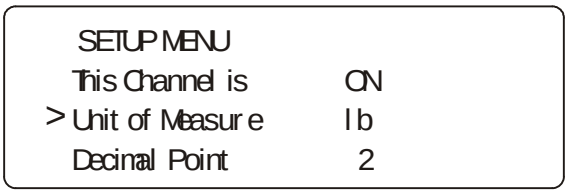


FIG. 4-15 SETUP MENU/UNIT OF MEASURE

Step 2. Press the right or left arrow buttons to make your selection.
Step 3. Press the Enter button to save the setting.

Decimal Point Parameter

About the Decimal Point Parameter

The Decimal Point Parameter is set to determine the resolution you want for a fill/dispense. Here you set the location of the decimal point for the weight resolution. The higher the number the farther to the left the decimal point moves and the higher the resolution of the scale. It is important to note that setting the resolution does effect the overall accuracy of the instrument. Increasing the number of decimal points increases the overall accuracy of the instrument.

PARAMETER:DECIMAL POINT
RANGE: 0-6
DEFAULT: 2

Step 1. Press the down arrow button until the cursor is in front of Decimal Point. (See Fig. 4-16)

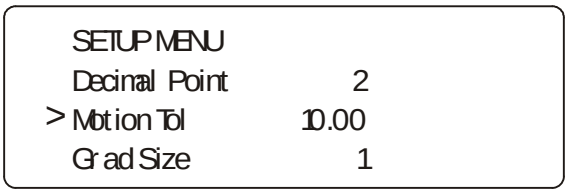


FIG. 4-16 SETUP MENU/DECIMAL POINT

Step 2. Press the right or left arrow buttons to make your selection.
Step 3. Press the Enter button to set the entry.

Motion Tolerance Parameter

About Motion Tolerance

Motion is the amount of allowable deviation between consecutive readings before a weighment is accepted as being complete. Setting Motion Tolerance establishes the amount of deviation you can allow in your particular fill/dispense process. The base motion number can be calculated by using the following formula:

Base Motion Number = (Total Load Cell Capacity/10,000) x 3

NOTE: Motion Tolerance must be greater than or equal to the Graduation Sizes. Our recommendation is three (3) graduation sizes.

PARAMETER:MOTION TOLERANCE
RANGE: .000001 - 999999
DEFAULT: 10

Step 1. Press the down arrow button until the cursor is in front of Motion Tol (Tolerance). (See Fig. 4-17)

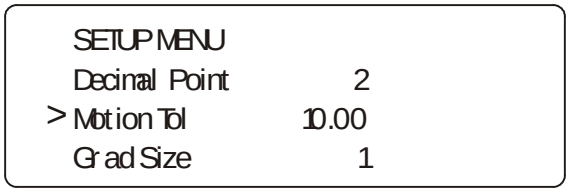


FIG. 4-17 SETUP MENU/MOTION TOLERANCE

Step 2. Press the Clear button to clear the current entry.
Step 3. Use the alphanumeric key pad to enter the new tolerance value.
Step 4. Press the Enter button to set the entry.

Graduation Size Parameter

About the Graduation Size Parameter

The Graduation Size is the Minimum increment displayed by the instrument. The Base Graduation Number can be calculated by dividing the Total Load Cell Capacity by 10,000. For example:

- With two (2) decimal points selected, the graduation size 10 will display increments of .10 engineering units. With two (2) decimal points selected, the graduation size 50 will display increments of .50 engineering units.

PARAMETER:GRAD SIZE
RANGE: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000
DEFAULT: 1

Step 1. Press the down arrow button until the cursor is in front of Grad Size. (See Fig. 4-18)

FIG. 4-18 SETUP MENU/GRADUATION SIZE

Step 2. Press the right or left arrow buttons to make your selection.
Step 3. Press the Enter button to set the entry.

Zero Tolerance Parameter

The Zero Tolerance parameter sets the weight units from zero that will be accepted as zero by the instrument. You can also turn on Auto Zero tolerance and set the Auto Zero Tolerance parameter and time. The Auto Zero Tolerance time setting sets the time it should take to Auto Zero the scale.

Auto Zero Tolerance Parameter

If ON, Auto Zero automatically zeros the empty scale to gross zero. However, it does not always automatically zero the scale. Auto zero tracking allows for small changes to be zero'd off, but not larger changes, even when they are within the auto zero tolerance.

PARAMETER:ZERO TOLERANCE
RANGE: .000001-999999
DEFAULT: 10.0

NOTE: CWM mode range is 0-4% of scale capacity.

PARAMETER: AUTO ZERO TOLERANCE
RANGE: OFF/ON
DEFAULT: OFF

Zero Reminder Parameter

The Zero Reminder when turned ON, when you zero the instrument asks you if you are sure you want to zero the instrument.

PARAMETER:ZERO REMINDER
RANGE: ON/OFF
DEFAULT: OFF

Step 1. Press the down button until the cursor is in front of Zero Tolerance. (See Fig. 4-19)

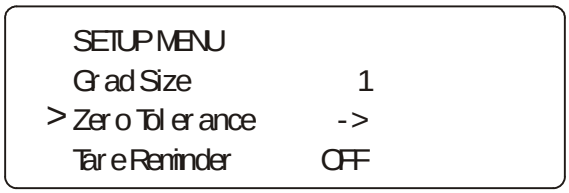


FIG. 4-19 SETUP MENU/SELECTING ZERO TOLERANCE

Step 2. Press the Enter button. The Zero Tolerance Menu appears with the cursor in front of Zero Tolerance. (See Fig. 4-20)

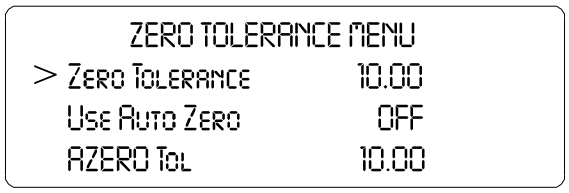


FIG. 4-20 ZERO TOLERANCE MENU/ZERO TOLERANCE

Step 3. Press the Clear button to clear the current value.
Step 4. Use the alphanumeric key pad to enter the new Zero Tolerance value.

NOTE: CWM mode: If tolerance is set greater than 4% of scale capacity, the value will be truncated.

Step 5. Press the Enter button to set the entry.
Step 6. Press the down arrow button until the cursor is in front of Use Auto Zero. (See Fig. 4-21)

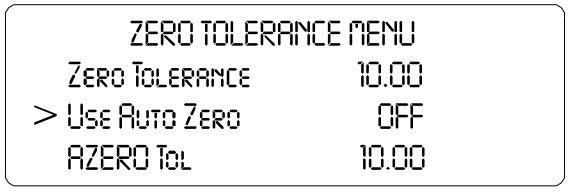


FIG. 4-21 ZERO TOLERANCE MENU/USE AUTO ZERO

Step 7. Press the right or left arrow buttons to toggle between OFF or ON.
Step 8. Press the Enter button to set the entry.
Step 9. Press the down arrow button until the cursor is in front of AZERO Tol. (See Fig. 4-22)

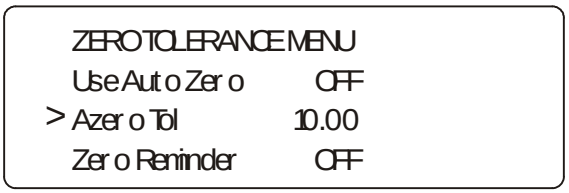


FIG. 4-22 ZERO TOLERANCE MENU/AUTO ZERO TOLERANCE

Step 10. Press the Clear button to clear the current value.
Step 11. Use the alphanumeric key pad to enter the new Auto Zero Tolerance value.

NOTE: CWM mode: If tolerance is set greater than 4% of scale capacity, the value will be truncated.

Step 12. Press the Enter button to set the entry.
Step 13. Press the down arrow button until the cursor is in front of Zero Reminder. (See Fig. 4-23)

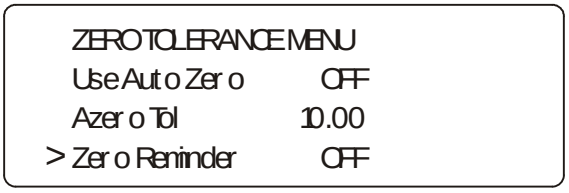


FIG. 4-23 ZERO TOLERANCE MENU/ZERO REMINDER

Step 14. Press right or left button to toggle between ON and OFF.
Step 15. Press the Enter button to set the entry.

- When you press the Zero button a message appears asking you if you want to zero the instrument. (See Fig. 4-24) Follow the instructions listed in the message.

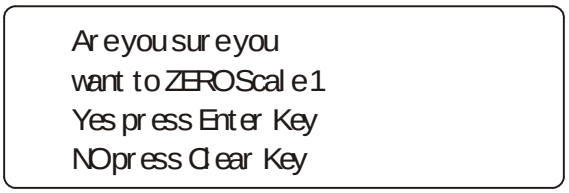


FIG. 4-24 ZERO REMINDER MESSAGE

Step 16. Press the Exit button to return to the SETUP MENU.
Step 17. Press the Down Arrow button until the cursor is in front of “Tare Reminder”.

Tare Reminder Parameter

About the Tare Reminder Parameter

The Tare Reminder when turned ON and you press the Tare button, a message appears asking if you are sure that you want to Tare the instrument.

PARAMETER:TARE REMINDER
RANGE: ON/OFF
DEFAULT: OFF

Step 1. Press the right or left arrow buttons to toggle between ON and OFF.

- When you press the Tare button a message appears asking if you are sure you want to Tare the instrument. (See Fig. 4-25) Follow the instruction in the message.

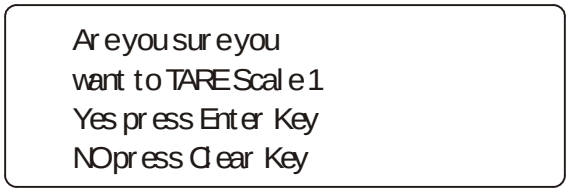


FIG. 4-25 TARE REMINDER MESSAGE

Step 2. Press the Enter button to set the entry.
Step 3. Press the Exit button to return to the Setup Menu.
Step 4. Press the down arrow until the cursor is in front of "Averages".

Averages Parameter

About the Averages Parameter

This setting is to aid in ignoring the effects of material impact. If material is not entering or exiting the scale evenly, weight fluctuations can be seen. Applications requiring very quick weight readings should reduce this setting to it's minimum. If the weight is unstable due to material impacting, increase the averages. This sets the number of weight readings that will be used to compute the displayed weight. The average is a sliding average so that a new average is available for display at every reading.

The Weight Controller does 55 updates per second which translates to an update approximately every 20 milliseconds. If you average enough weight readings the weight loss or gain remains smooth. If you average the weight too much you can cause over filling. Here is an example of 5 averages reading 5 Engineering Units (EU):

20ms	20ms	20ms	20ms	20ms
0	0	0	0	5
0	0	0	5	5
0	0	5	5	5
0	5	5	5	5
5	5	5	5	5
1	2	3	4	5 = 5 EU in 100ms

TABLE 4-1: 5 AVERAGES READING 5 EU

PARAMETER:AVERAGES
RANGE: 1-250
DEFAULT: 10

Step 1. Press the Down arrow until the cursor is in front of Averages. (See Fig. 4-26)

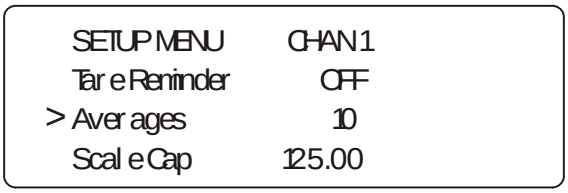


FIG. 4-26 SETUP MENU/AVERAGES

Step 2. Press the right or left arrow buttons to increase or decrease the number of averages.
Step 3. Press the Enter button to set the entry.
Step 4. Press the down arrow button until the cursor is in front of "Scale Cap".

Scale Capacity Parameter

About the Scale Capacity Parameter

If this value is exceeded by 5% an HI indication appears on the front display. Communications to and from optional devices are not effected. This value is the nominal operating capacity of the scale. (It is recommended that you use the default parameter)

PARAMETER:SCALE CAP
RANGE: .000001-999999
DEFAULT: 999999

Step 1. Press the Down arrow button until the cursor is in front of Scale Cap. (See Fig. 4-27)

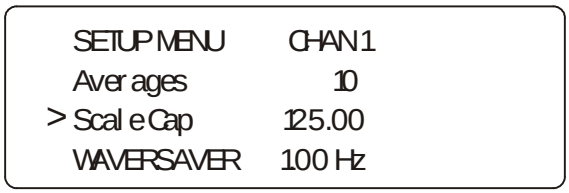


FIG. 4-27 SETUP MENU/SCALE CAPACITY

Step 2. Press the Clear button to clear the current entry.
Step 3. Use the alphanumeric key pad to enter the new Scale Capacity value.
Step 4. Press the Enter button to set the entry.

The WAVERSAVER® Parameter

About the WAVERSAVER Parameter

Typically, mechanical noise (from other machinery in a plant environment) is present in forces larger than the weight forces trying to be detected. The Weight Controller is fitted with WAVERSAVER® technology which eliminates the effects of vibratory forces present in all industrial weight control and measurement applications. By eliminating the factor of vibratory forces the Weight Controller is capable of identifying the actual weight data. WAVERSAVER® enables the Weight Controller to distinguish between actual weight data and mechanical noise, both of which are typically transferred to the Weight Controller by the load cell signal. WAVERSAVER® can be configured to ignore noise with frequencies as low as 0.25 Hz. One of four higher additional cut off frequencies may be selected to provide a faster instrument response time. The function is user selectable and can be turned off.

PARAMETER:WAVERSAVER®
RANGE: .25 HZ, .50 HZ, 1.0 HZ, 3.50 HZ, 7.50 HZ, OFF
DEFAULT: 1.00 HZ

Step 1. Press the Down arrow button until the cursor is in front of WAVERSAVER®. (See Fig. 4-28)

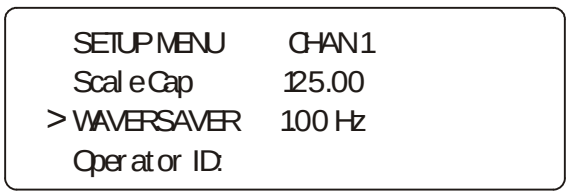


FIG. 4-28 SETUP MENU/WAVERSAVER

Step 2. Press the right or left arrow buttons to select the setting or turn WAVERSAVER off.
Step 3. Press the Enter button to set the entry.
Step 4. Press the Down arrow button until the cursor is in front of “Operator ID”. (See Fig. 4-29)

Operator ID

About Operator ID

The Operator ID is the ID of the user who is going to operate the Weight Controller or service the instrument. Select three letters or numbers or any combination of the two that adequately identifies the user. We have provided some examples below for your assistance. The Operator ID is used in connection with the security level of the user.

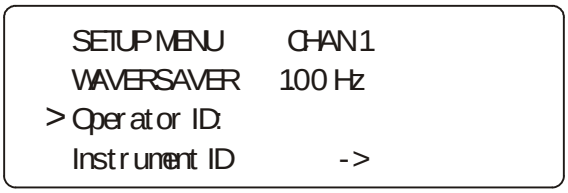


FIG. 4-29 SETUP MENU/OPERATOR ID

Step 1. Use the alphanumeric key pad to enter your Operator ID or press the Clear button to clear the previous entry and use the alphanumeric key pad to enter you Operator ID.
Step 2. A Operator ID is three (3) characters long and can consist of alphanumeric characters.

Some examples of Operator IDs:

- Joe
- 312
- J15
- JD7

Step 3. Press the Enter button to set the entry.
Step 4. Press the Down arrow button until the cursor is in front of Instrument ID.

Instrument ID

About Instrument ID

The Instrument ID parameter is used to provide specific identification for a Weight Controller. This is extremely important when using several Weight Controllers in a process. A unique Instrument ID allows you to identify one instrument from another.

PARAMETER:INSTRUMENT ID
RANGE: 19 CHARACTERS
DEFAULT: HARDY 3030

Step 1. Press the down arrow until the cursor is in front of Instrument ID. (See Fig. 4-30)

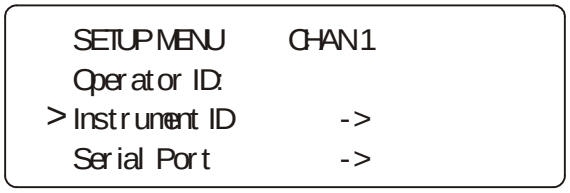


FIG. 4-30 INSTRUMENT ID PARAMETER

Step 2. Press the Enter button. The Instrument ID Menu appears. (See Fig. 4-31)

FIG. 4-31 INSTRUMENT ID MENU/CHEM 3 FILLER

Step 3. Press the Clear button to clear the current entry.
Step 4. Use the alphanumeric buttons to enter a new Instrument ID. It is important to be as descriptive as you can in 19 characters. In our example we identified the instrument as the Chemical 2 scale. That is the 2nd Chemical scale in a process.
Step 5. Press the Enter button to set the entry.
Step 6. Press the Exit button to return to the SETUP MENU.
Step 7. Press the down arrow until the cursor is in front of Serial Port. (See Fig. 4-32)

Serial Port Parameters

About the Serial Port Setup Parameters

The Serial Port Parameters are set to operate the Printer or Scoreboard which can print out or display on a Scoreboard the Gross, Net and Tare with a Rate of Change Option.

NOTE: If Scoreboard is configured the Print button does not function.

PARAMETER:SERIAL PORT
RANGE: PRINTER - SCOREBOARD
DEFAULT: PRINTER

PARAMETER:BAUD RATE
RANGE: 300, 1200, 2400, 4800, 9600, 19200
DEFAULT: 9600

PARAMETER:PARITY
RANGE: NONE, ODD, EVEN
DEFAULT: NONE

PARAMETER:DATA BITS
RANGE: 7 OR 8
DEFAULT: 8

PARAMETER:AUTO PRINT
RANGE: ON/OFF
DEFAULT: OFF

Step 1. Press the down arrow until the cursor is in front of Serial Port. (See Fig. 4-32)

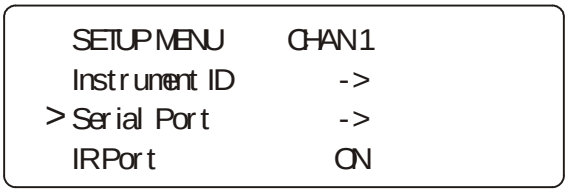


FIG. 4-32 SETUP MENU/SERIAL PORT

Step 2. Press the Enter button. The Serial Port Menu appears with the cursor in front of Serial Scoreboard or Serial Printer. (See Figs. 4-33 and 34)

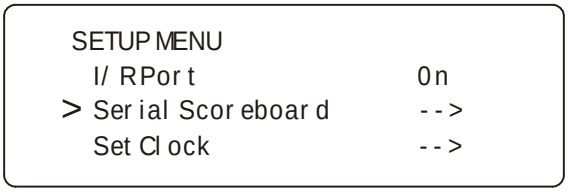


FIG. 4-33 SERIAL PORT MENU/SCOREBOARD SETUP

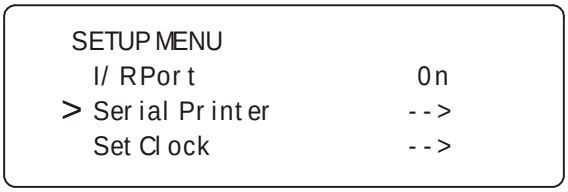


FIG. 4-34 SERIAL PORT MENU/PRINTER SETUP

Step 3. Press the right or left arrow to toggle between Printer and Scoreboard.
Step 4. Press the Enter button. The Port Setup Menu appears. (See Fig. 4-35)

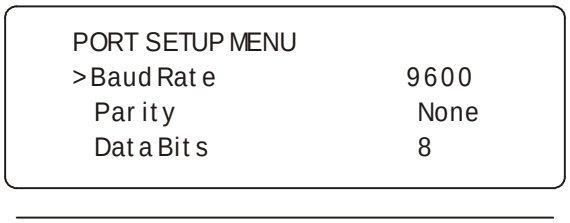


FIG. 4-35 PORT SETUP MENU/BAUD RATE

Step 5. Press the right or left arrow buttons to select the Baud Rate. The Selections are:

- 300
- 1200
- 2400
- 4800
- 9600
- 19200

Step 6. Press the Enter button to set the entry.
Step 7. Press the down arrow button until the cursor is in front of Parity. (See Fig. 4-36)

FIG. 4-36 PRINTER PORT MENU/PARITY

Step 8. Press the right or left arrow buttons to select Parity. The Selections are:

- NONE
- ODD
- EVEN

Step 9. Press the down arrow until the cursor is in front of Data Bits. (See Fig. 4-37)

FIG. 4-37 PRINTER PORT MENU/DATA BITS

Step 10. Press the right or left arrow buttons to select the Data Bits you want. The Selections are:

- 8
- 7

Step 11. Press the enter button to set the entry.
Step 12. Press the Exit button two (2) times to return to the SETUP MENU.

Tare Limit Parameter

About the Tare Limit Parameter

The Tare Limit Parameter limits the amount of automatic tare. Tare is the artificial zeroing of the weight hopper so that a new weight can be displayed. Also, the action of adjusting out the known weight of the container from the total indicated weight, so that the indicator reads net weight directly.

PARAMETER:TARE LIMIT
RANGE: .000001-999999
DEFAULT: 999999

Step 1. Press the down arrow until the cursor is in front of Tare Limit. (See Fig. 4-38)

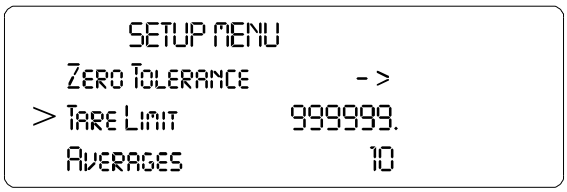


FIG. 4-38 SETUP MENU/TARE LIMIT

Step 2. Press the Clear button to clear the current entry.
Step 3. Use the alphanumeric key pad to enter the new Tare Limit value.
Step 4. Press the Enter button to set the entry.
Step 5. Press the Down arrow button until the cursor is in front of “IR Port”.

Set Clock Parameter

About Setting the Clock

You set the Hour, Minutes, Month, Day and Year parameters here. These settings are the time stamps for the alarms.

PARAMETER:HOURS
RANGE: hh (01-24)
DEFAULT: NONE

PARAMETER:MINUTES
RANGE: mm (01-60)
DEFAULT: NONE

PARAMETER:MONTH
RANGE: Jan. thru Dec.
DEFAULT: NONE

PARAMETER:DAY
RANGE: dd (01-31)
DEFAULT: NONE

PARAMETER:YEAR
RANGE: yyyy (2001, 2002, 2003)
DEFAULT: NONE

PARAMETER:TIMEZONE
RANGE: -12 TO +12
DEFAULT: -8

Step 1. Press the Down arrow button until the cursor is in front of Set Clock. (See Fig. 4-39)

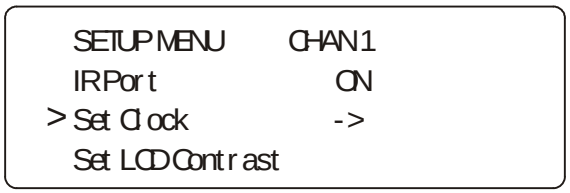


FIG. 4-39 SETUP MENU/SET CLOCK

Step 2. Press the Enter button. The Clock Setup Menu appears with the cursor in front of Set Hours. (See Fig. 4-40)

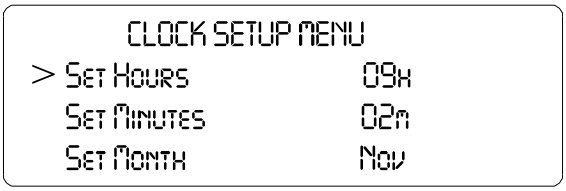


FIG. 4-40 CLOCK SETUP MENU/SET HOURS

Step 3. Press the right or left arrow buttons to change the Hours setting.
Step 4. Press the Enter button to set the entry.
Step 5. Press the Down arrow button until the cursor is in front of Set Minutes.
Step 6. Press the right or left arrow buttons to change the Minutes setting.
Step 7. Press the Enter button to set the entry.
Step 8. Press the Down arrow button until the cursor is in front of Set Month. (See Fig. 4-41)

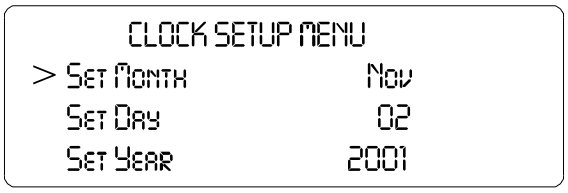


FIG. 4-41 CLOCK SETUP MENU/SET MONTH

Step 9. Press the right or left arrow buttons to change the Month setting.
Step 10. Press the Enter button to set the entry.
Step 11. Press the Down arrow button until the cursor is in front of Set Day.
Step 12. Press the right or left arrow buttons to change the Day setting.
Step 13. Press the Enter button to set the entry.
Step 14. Press the Down arrow button until the cursor is in front of Set Year.
Step 15. Press the right or left arrow buttons to change the Year setting.
Step 16. Press the Down arrow button until the cursor is in front of Timezone. (See Fig.4-42)

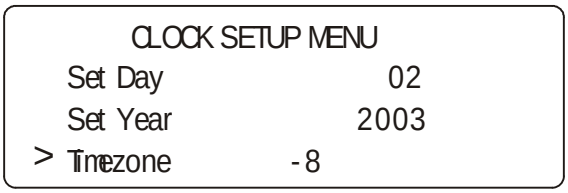


FIG. 4-42 CLOCK SETUP MENU/SET GMT

About Timezones (Greenwich Mean Time)

There are 25 integer World Time Zones from -12 through 0 (GMT) to +12. Each one is 15° of longitude as measured East and West from the Prime Meridian of the World which is at Greenwich, England. Some countries have adopted non-standard time zones, usually a 30 minute offset.

Each Time Zone is measured relative to Greenwich, England. Civilian designations are typically three letter abbreviations (e.g. EST) for most time zones. Below is a list of the abbreviated time zones with the GMT time adjustment. You will see the time zone ranges in the e-mail header.

GMT	Civilian Time Zones	Cities
GMT	GMT: Greenwich Mean UT: Universal UTC: Universal Co-ordinated WET: Western Europe	London, England Dublin, Ireland Edinburgh, Scotland Reykjavik, Iceland Casablanca, Morocco
EAST OF GREENWICH		
+1	CET: Central Europe	Paris, France Berlin, Germany Amsterdam, Holland Brussels, Belgium Vienna, Austria Madrid, Spain Rome, Italy Bern, Switzerland Oslo, Norway
+2	EET: Eastern Europe	Athens, Greece Helsinki, Finland Istanbul, Turkey Jerusalem, Israel Harare, Zimbabwe
+3	BT: Baghdad	Kuwait Nairobi, Kenya Riyadh, Saudi Arabia Moscow. Russia
+3:30		Tehran, Iran
+4		Abu Dhabi, UAE Muscat Tblisi Volgograd Kabul
+4:30		Afghanistan
+5		
+5:30		India
+6		
+6:30		Cocos Islands
+7		
+8	CCT: China Coast	Shanghai, China Hong Kong, China Beijing, China
+9	JST: Japan Standard	Tokyo, Japan Osaka, Japan Taipei, Taiwan
+9:30	Australian Central Standard	Darwin, Australia Adelaide, Australia
+10	GST: Guam Standard	
+10:30		Lord Howe Island
+11		
+11:30		Norfolk Island
+12	IDLE: International Date Line East NZST: New Zealand Standard	Wellington, NZ Fiji Marshall Islands
+13		Rawaki Island
+14		Line Islands
WEST OF GREENWICH		
-1	WAT: West Africa	Azores Cape Verde Islands
-2	AT: Azores	
-3		Brasilia, Brazil Buenos Aires, Agentina Georgetown, Guyana
-3:30		Newfoundland
-4	AST: Atlantic Standard	Caracas, Venezuela La Paz
-5	EST: Eastern Standard	Bogota, Colombia Lima, Peru New York, NY, USA
-6	CST: Central Standard	Chicago, Illinois, USA Mexico City, Mexico Saskatchewan, Canada
-7	MST: Mountain Standard	Phoenix, Arizona Denver, Colorado
-8	Pacific Standard	Seattle, Washington Portland, Oregon San Francisco, CA
-9	YST: Yukon Standard	
-10	AHST: Alaska-Hawaii Standard CAT: Central Alaska HST: Hawaii Standard	Anchorage, Alaska Honolulu, Hawaii
-11	NT: Nome	Nome, Alaska
-12	IDLW: International Date Line West	

TABLE 4-2: GREENWICH TIME ZONES (GMT)

Step 17. Check Table 4-2 for the time zone you are in.
Step 18. Press the right or left arrow until the correct time zone appears. For example Pacific Standard Time is -8.
Step 19. Press the Enter button to set the entry.
Step 20. Press the Exit button to return to the SETUP MENU.
Step 21. Press the Down arrow until the cursor is in front of Set LCD Contrast.

Set LCD Contrast Parameter

About the Set LCD Contrast Parameter

The Set LCD Contrast Parameter is used to increase or decrease the contrast on the display. Press the right arrow

button to increase the contrast. Press the left arrow to decrease the contrast.

PARAMETER:SET LCD CONTRAST
RANGE: NONE
DEFAULT: NONE

Step 1. Press the left or right arrow button to increase or decrease the contrast.
Step 2. Press the Down arrow button until the cursor is in front of Devicenet.

Ethernet Parameters

About the Ethernet Parameters

All Weight Controllers are designed with a selectable 10/100 base T Ethernet connection which links your PC to an embedded server in the instrument. You can connect to an instrument via the Internet, Intranet, Extranet, or VPN (Virtual Private Network). Your computer must have an ethernet card and cable with an RJ45 connector to connect to the instrument. Once connected you can, monitor, map and configure any of the instruments from your web browser from any location in your plant or enterprise. Help Dialogs are also available to assist when performing setup or troubleshooting of an instrument. In addition the browser connects you to the Hardy Web Site which connects the user to a full range of customer service and support. File downloads from your control room are a snap. No more hauling devices to download files to an instrument. Should you want to download a file or monitor the instrument from your laptop at the site, simply connect a short cable from the lap top to the Ethernet connect at the rear panel of the instrument to transfer files, monitor or configure the instrument. No matter where you are, if you are connected to our instrument you can configure and troubleshoot the HI 3030 Weight Controller. Furthermore if the packet output is too high simply set the packet output to a lower setting.

About IP Addresses

An IP address consists of 32 bits. It is composed of two parts:

- The Network Number
- The Host Number

By convention, the address is expressed as four decimal numbers separated by periods, such as “200.1.2.3” representing the decimal value of each of the four bytes. Valid addresses thus range from 0.0.0.0 to 255.255.255.255, a total of about 4.3 billion addresses.

It is recommended that you leave the Mask, Gate and DNS settings alone. Contact your Network Administrator if you need to set these parameters.

PARAMETER:ETHERNET
RANGE: 0.0.0.0 - 255.255.255.255
DEFAULT: 192.168.110.1

Step 1. Press the Down arrow button until the cursor is in front of Ethernet. (See Fig. 4-43)

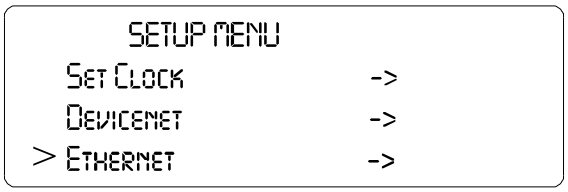


FIG. 4-43 SETUP MENU/ETHERNET

Step 2. Press the Enter button. The Ethernet Menu appears with the cursor in front of the IP Address. (See Fig. 4-44)

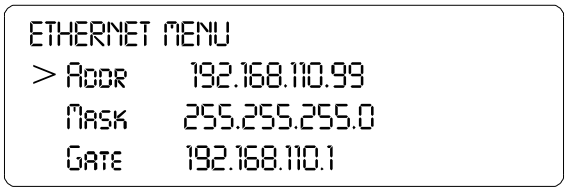


FIG. 4-44 ETHERNET MENU/IP ADDRESS WITH DEFAULT IP ADDRESS

Step 3. Press the Clear button to clear the address.

NOTE: Figure 4-44 has the Default IP address. You must change this address when starting the instrument for the first time.

Step 4. Use the alphanumeric key pad to enter the new address. Remember there must be a period between each port of the address. (e.g. 186.245.263.12)
Step 5. This is the only parameter you need to change. If you need to change the other parameters, contact your Network Administrator for assistance.
Step 6. Press the Enter button to set the entry.
Step 7. Press the Exit button to return to the SETUP MENU.

PARAMETER:HARDYLINK
RANGE: 1/SEC, 11/SEC, 55/SEC
DEFAULT: 55/SEC

The Hardy Link Parameter enables you to set the UDP packet output from the HI 3030 so that the controller does not overburden your network with data packets. If you find that the packet output is slowing your Ethernet Network,

simply set the output to 1/sec or 11/sec whichever meets your needs.

Step 1. From the Ethernet Sub-menu press on the down arrow until the cursor is in front of Hardy-Link. (See Fig. 4-45)

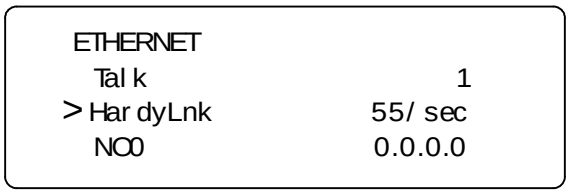


FIG. 4-45 HARDY-LINK PARAMETER/SELECTING 11/SEC OUTPUT

Step 2. Press on the left or right arrow button until the output you want appears. In our example we selected 11/sec. (See Fig. 4-46)

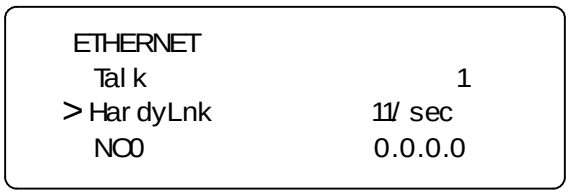


FIG. 4-46 HARDY-LINK/SAVING PACKET OUTPUT

Step 3. Click on the Enter button to save the selection.
Step 4. Press the Exit button to return to the Standby Display.

Option Cards Configuration

Option Card Configuration Procedures can be found in the HI 3000 Series User's Guide. Configuration Procedures for the Option Cards are common for all HI 3000 Series Products. However, the Analog Option Output Card configuration is contained in this chapter.

Analog Option Card Configuration

NOTE: You cannot configure the Analog Option Card from the front the panel.

PARAMETER:ANALOG CHANNEL CONFIGURATION
RANGE: 0-5 V, 0-10 V, 4-20 MILLIMAPS, 0-20 MILLIAMPS
DEFAULT: 0-10 V, LO - 0, HI - 100

Configuring the Analog Option Card from the Web Page

Step 1. From Weight Controller Home Page click on Configuration. (See Fig. 4-47) The Configuration page appears. (See Fig. 4-48)

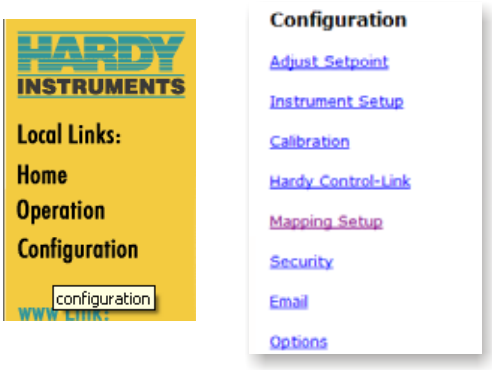


FIG. 4-47 WEIGHT CONTROLLER HOME PAGE/ SELECTING CONFIGURATION

FIG. 4-48 CONFIGURATION PAGE/SELECTING OPTIONS

Step 2. Click on Options. The Options page appears. (See Fig. 4-49)

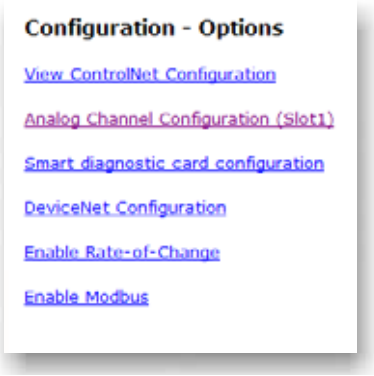


FIG. 4-49 CONFIGURATION/OPTIONS/SELECTING ANALOG CHANNEL CONFIGURATION

Step 3. Click Analog Channel Configuration to display the Analog Channel Configuration page. (See Fig. 4-50)

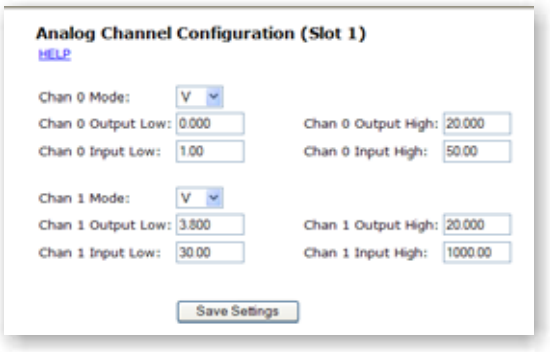
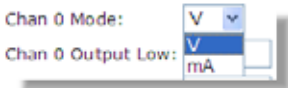

Analog Channel Configuration (Slot 1)
HELP
Chan 0 Mode: V
Chan 0 Output Low: 0.000
Chan 0 Output High: 20.000
Chan 0 Input Low: 1.00
Chan 0 Input High: 50.00
Chan 1 Mode: V
Chan 1 Output Low: 3.800
Chan 1 Output High: 20.000
Chan 1 Input Low: 30.00
Chan 1 Input High: 1000.00
Save Settings

FIG. 4-50 ANALOG CHANNEL CONFIGURATION PAGE

Step 4. Click on the Chan # Mode pull down list and select either volts (V) and milliamps (mA).



NOTE: Don't be confused about the Channels. On this page you are configuring analog for the Analog board channels not the instrument channel (channels 1-4).

Step 5. In the Input and Output high and low text fields you want to change, (See Fig. 4-51) type in the values to use for your application.

Step 6. Click Save Settings to save the configuration.

Step 7. Use the same procedure to configure other Channels.

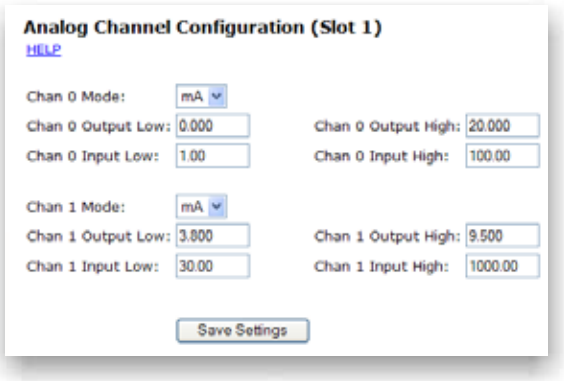

Analog Channel Configuration (Slot 1)
HELP
Chan 0 Mode: mA
Chan 0 Output Low: 0.000
Chan 0 Output High: 20.000
Chan 0 Input Low: 1.00
Chan 0 Input High: 100.00
Chan 1 Mode: mA
Chan 1 Output Low: 3.800
Chan 1 Output High: 9.500
Chan 1 Input Low: 30.00
Chan 1 Input High: 1000.00
Save Settings

FIG. 4-51 ANALOG CHANNEL CONFIGURATION (SLOT 1) SAVING SETTINGS

Step 8. Should you have two analog cards installed in the Option Slots 0 and 1, to configure the other Analog card, repeat the above process starting from the Options page.

Configuring the Analog Option Card from the Front Panel

Step 1. From the Configuration Options screen , select Analog I/O Slot # ON and press the Enter button. (See Fig. 4-52)

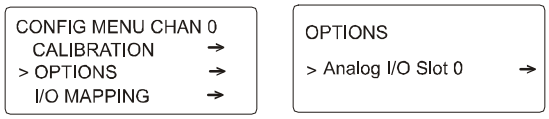


FIG. 4-52 SELECTING ANALOG I/O SLOT #

Step 2. On the Analog I/O Slot # screen, select the Slot # Channel # option to configureand press Enter. (See Fig. 4-53 left side)

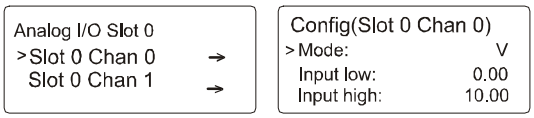


FIG. 4-53 CHOOSING SLOT, CHANNEL, AND MODE

Step 3. The cursor will appear in front of Mode. Use the right and left arrows to toggle between volts (V) and milliamps (mA), then press Enter to select your choice. (See Fig. 4-53 right side)

Step 4. Use the up and down arrows to position the cursor in front of the Input or Output high or low value you want to change. (See Fig. 4-54 left and right)

Step 5. To change the selected value, use the number and decimal point keys to enter a new value, then press Enter to save the new value.

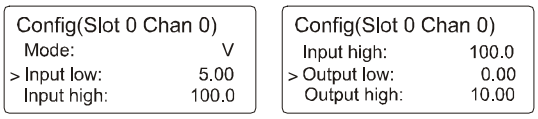


FIG. 4-54 SETTING THE HIGH AND LOW VALUES

Step 6. Should you have two analog cards installed in the Option Slots 0 and 1, to configure the other Analog card, repeat the above process starting from the Options page.

Mapping the Output

Currently, mapping for the analog card can only be done from the WEB interface.

Step 1. Outputs (e.g. Gross, Net, Rate-of-Change) must be mapped to the Analog Output table. From the Weight Controller Home Page click Configuration to open the Configuration menu. (See Fig. 4-55)

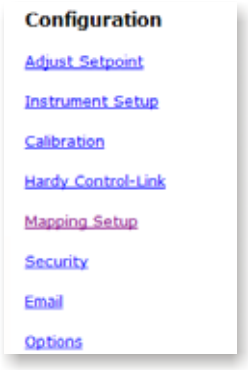


FIG. 4-55 CONFIGURATION MENU

Step 2. Click Mapping Setup to open the Mapping Setup 1/ page. (See Fig. 4-56)

FIG. 4-56 CONFIGURATION/MAPPING SETUP 1/ SELECTING DESTINATION/ANALOG OUT SLOT 0

Step 3. Click Analog Out Slot 0 as the destination to open the screen below. (See Fig. 4-57)

FIG. 4-57 MAPPING SETUP 1/SELECTING ANALOG OUTPUT CHANNEL

NOTE: Do not confuse the Analog Output Slot 0 or Slot 1 Channels 0 and 1 with the Instrument channels 1-4. The channel selection for the preceding step is for the Analog Output Slot, not the instrument channel.

Select the instrument channel you want on the Mapping Setup Page 2 (Sources).

Step 4. Click on the Select button to select the analog output channel # destination. The destination appears to the left of the equals sign in the Current Mappings text field. In this case the destination symbol is HFO85. (See Fig. 4-58)

FIG. 4-58 CURRENT MAPPINGS/PRESSING JUMP TO SOURCE PAGE

Step 5. For more information about mapping symbols, click the mapping symbols link at the top of the page (See Fig. 4-59) to view the Mapping Symbols Dictionary. (See Fig. 4-60)

FIG. 4-59 MAPPING SETUP 1/OPENING LIST OF MAPPING SYMBOLS

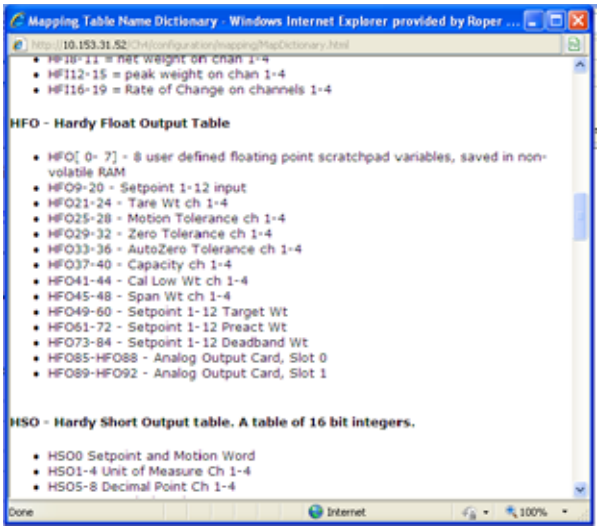

Mapping Table Name Dictionary - Windows Internet Explorer provided by Roper ...
HFI12-15 = peak weight on chan 1-4
HFI16-19 = Rate of Change on channels 1-4
HFO - Hardy Float Output Table
HFO[0- 7] - 8 user defined floating point scratchpad variables, saved in non-volatile RAM
HFO9-20 - Setpoint 1-12 input
HFO21-24 - Tare Wt ch 1-4
HFO25-28 - Motion Tolerance ch 1-4
HFO29-32 - Zero Tolerance ch 1-4
HFO33-36 - AutoZero Tolerance ch 1-4
HFO37-40 - Capacity ch 1-4
HFO41-44 - Cal Low Wt ch 1-4
HFO45-48 - Span Wt ch 1-4
HFO49-60 - Setpoint 1-12 Target Wt
HFO61-72 - Setpoint 1-12 Preact Wt
HFO73-84 - Setpoint 1-12 Deadband Wt
HFO85-HFO88 - Analog Output Card, Slot 0
HFO89-HFO92 - Analog Output Card, Slot 1
HSO - Hardy Short Output table. A table of 16 bit integers.
HSO0 Setpoint and Motion Word
HSO1-4 Unit of Measure Ch 1-4
HSO5-8 Decimal Point Ch 1-4
Done
Internet
100%

FIG. 4-60 DICTIONARY OF MAPPING SYMBOLS

Step 6. Scroll the list until you find the HF0 - Hardy Float Output Table/Analog Output Card Slot 0 (HFO085).

Step 7. After selecting the destination, you need to select a source. Click the Jump to Sources Page button (See Fig. 4-58) to display the Mapping Setup 2 (Sources) page. (See Fig. 4-61)

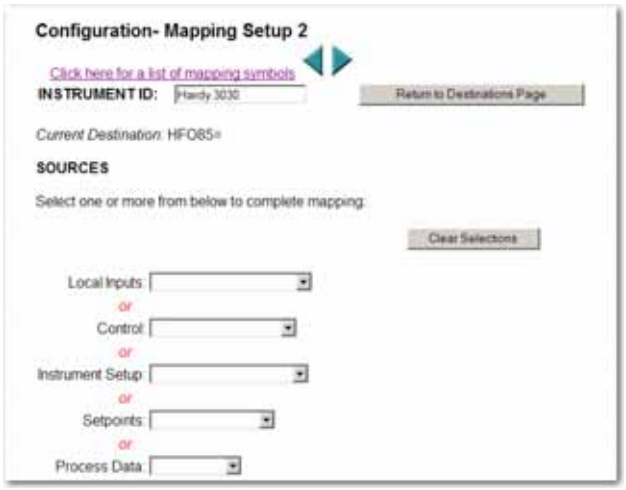


FIG. 4-61 CONFIGURATION/MAPPING SETUP 2 PAGE

Step 8. You can select almost any source from this page. Select Gross Wt. from the Process Data pull down list. (See Fig. 4-62)

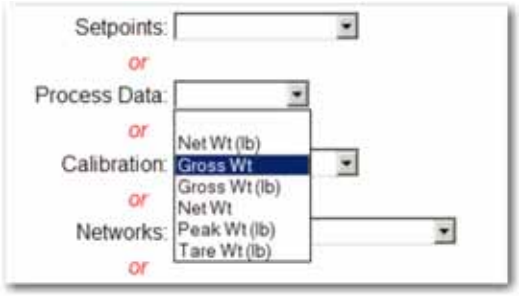


FIG. 4-62 MAPPING/SELECTING SOURCE/GROSS WT

Step 9. The Channel selection text field appears to the right. Enter the instrument channel (1-4) you want for the source. (See Fig. 4-63) Our example uses channel 1.

FIG. 4-63 PROCESS DATA/GROSS WT/CHANNEL 1

NOTE: This channel selection is for the instrument channel not the analog output slot channel.

Step 10. When you click Select, the source symbol (Gross Wt = HF14) is displayed in the Mappings field to the right of the equals symbol. (See Fig. 4-64)

FIG. 4-64 DESTINATION AND SOURCE COMPLETE

Step 11. Click Map to complete the mapping process. The map appears in the Current Mappings list. (See Fig. 4-65) The Gross Weight is assigned to the Analog Output table for analog slot 0, channel 1.

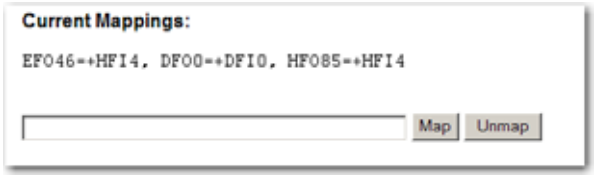


FIG. 4-65 GROSS WT MAPPED TO THE ANALOG OUTPUT TABLE SLOT 0

Step 12. To map to the other Analog Output tables repeat the steps above for each channel.

Weight Controller Configuration From the Web Page

Step 1. From the Weight Controller Home Page, click on Configuration. (See Fig. 4-66) The Configuration Page appears. (See fig. 4-67)

FIG. 4-62 WEIGHT CONTROLLER HOME PAGE/ SELECTING CONFIGURATION

FIG. 4-63 CONFIGURATION PAGE/SELECTING INSTRUMENT SETUP

Step 2. Click on Instrument Setup. The Configuration-Instrument Setup Page appears. (See Fig. 4-68)

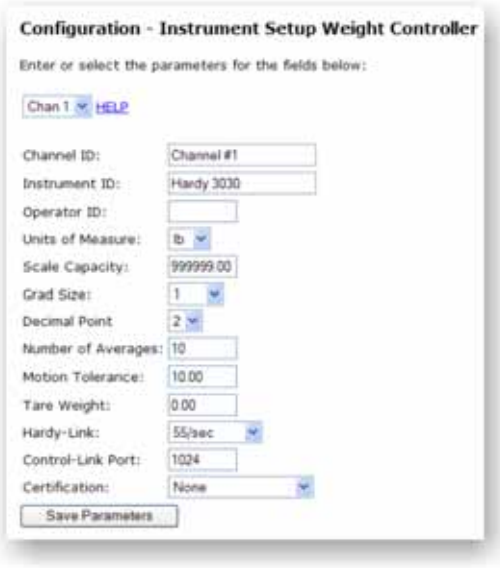


FIG. 4-64 CONFIGURATION - INSTRUMENT SETUP WEIGHT CONTROLLER PAGE

Step 3. To select a channel, click on the Channel pull down menu. (See Fig. 4-69)

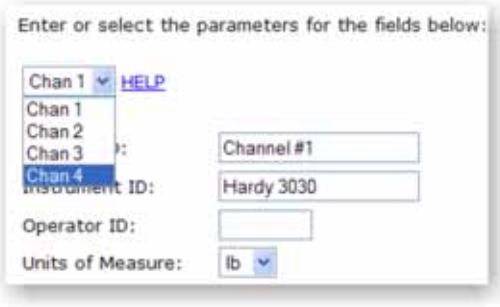


FIG. 4-65 CONFIGURATION - INSTRUMENT SETUP WEIGHT CONTROLLER PAGE/SELECTING CHANNEL

Step 4. Click on the channel you want to configure. Our example shows channel 4.

Step 5. To create or change a Channel ID, double click in the text field next to Channel ID. (See Fig. 4-70)

Step 6. Type in the Channel ID you want for this channel. In our example we used “Packer 1”.

Step 7. To create or change an Instrument ID, double click in the text field next to Instrument ID.

Step 8. Type in the Instrument ID you want for this instrument. In our example we used “Chem Scale 3”.

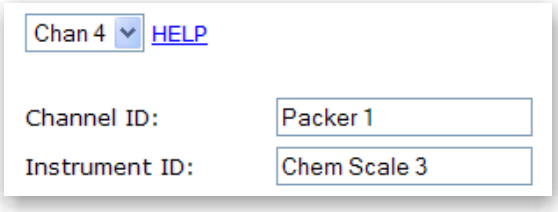


FIG. 4-66 CONFIGURATION - INSTRUMENT SETUP WEIGHT CONTROLLER PAGE/SETTING PARAMETERS

Step 9. To create or change an Operator ID, double click in the text field next to Operator.

Step 10. Type in the User ID. Remember you only have three characters so be brief. We used “JD” (John Doe).

Step 11. To select the Unit of measure, click on the Unit of Measure pull down menu. (See Fig. 4-71)

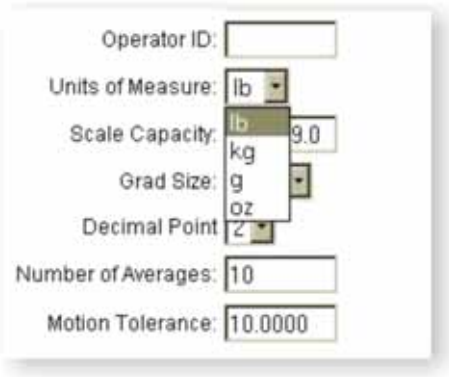


FIG. 4-67 CONFIGURATION - INSTRUMENT SETUP WEIGHT CONTROLLER PAGE/SELECTING UNIT OF MEASURE

Step 12. Click on the Unit of measure you want for this channel.

Step 13. To Set the Scale Capacity, double click in the text field next to Scale Capacity.

Step 14. Type in the Scale Capacity of the device attached to this channel.

*NOTE: Make sure you set the scale capacity correctly. Setting it too low might lead to the material on the scale exceeding this Channel's Scale Capacity value. When the Scale Capacity value is exceeded, there will be no weight visible on the display (namely a series of ********). Setting it too high might create problems in your weigh process.*

Step 15. To set the Grad (Graduation) Size, click on the Grad Size pull down menu. (See Fig. 4-72)

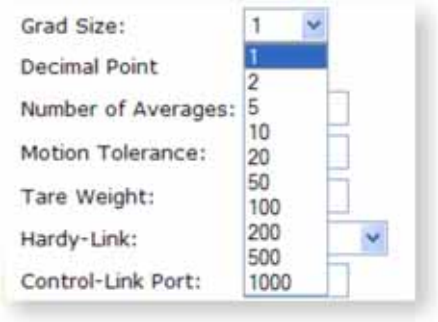


FIG. 4-68 CONFIGURATION - INSTRUMENT SETUP WEIGHT CONTROLLER PAGE/SELECTING GRAD SIZE

Step 16. Click on the Grad Size you want for the device connected to this channel.

Step 17. To set the Decimal point, click on the Decimal Point pull down menu. (See Fig. 4-73)

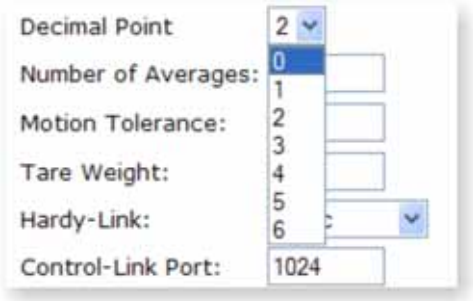


FIG. 4-69 CONFIGURATION - INSTRUMENT SETUP WEIGHT CONTROLLER PAGE/SELECTING DECIMAL POINT

Step 18. To set the Number of Averages, double click in the text field next to Number of Averages.

Step 19. Type in the number of averages for the device connected to this channel.

Step 20. To set the Motion Tolerance, double click in the text field next to Motion Tolerance.

Step 21. Type in the Motion tolerance for the scale that is connected to this channel.

Step 22. To set the Tare Weight, double click in the text field next to Tare Weight. (See Fig. 74)

FIG. 4-70 SETTING THE TARE WEIGHT

Step 23. Type in the Tare weight for the scale that is connected to this channel.

Step 24. To set the Hardy-Link packet output click on the Hardy-Link pull down list. (See Fig. 4-75)

FIG. 4-71 HARDY-LINK PARAMETER/SELECTING 1/SEC OUTPUT

Step 25. Click on the output you want. In our example we selected 1/sec. (See Fig. 4-76)

FIG. 4-72 HARDY-LINK/SAVING PACKET OUTPUT

PARAMETER:CONTROL-LINK PORT
RANGE: 1024-1055
DEFAULT: 1024

This parameter sets the Control-Link Port that packets are sent and by the HI 3030. The instruments listens and transmits from this port. It is important to remember that after setting the Control-Link Port parameter you will have to cycle power to make the change from one port setting to another.

Step 26. To set the Control-Link Port, double click in the Control-Link Port text field. (See Fig. 77)

FIG. 4-73 CONTROL-LINK PORT/SETTING PORT 1024

Step 27. Type in the port you want for the scale that is connected to this channel.

NOTE: After configuring the Control-Link Port you have to cycle power to make the change.

PARAMETER:CERTIFICATION
RANGE: NONE, 10000 D (US NTEP), AND 3000 D (CANADA)
DEFAULT: NONE

The Certification pull-down selection list allows you to select the Certification to apply. If you select US NTEP or Canada, you can no longer tare a negative gross weight. Also selecting either of these parameters sets the instrument to meet the certification standard, but it does not generate certification. To get an NTEP or Canada certification, you will need to request for the approproiate agency to come and certify the instrument.

Step 28. Select the certification type from the pull-down list pull down list. (See Fig. 4-78)

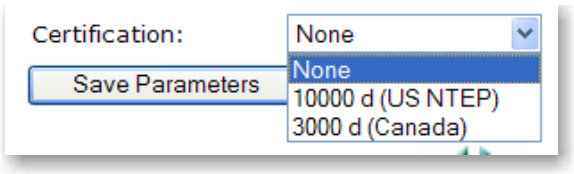


FIG. 4-74 SELECTING CERTIFICATION

Step 29. Click on the mode you want. In our case we selected 10000 D (US NTEP). (See Fig. 79)

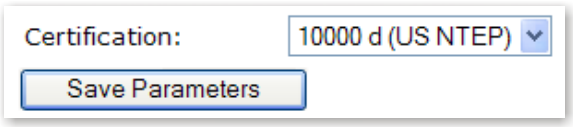


FIG. 4-75 NTEP MODE/SELECTING ON

Step 30. Click on the Save Parameters button to save the settings.

Step 31. To Configure the Serial Port, Click twice on the right arrow. The Serial Port Configuration page appears. (See Fig. 80)

FIG. 4-76 SERIAL PORT CONFIGURATION

Step 32. Click on the Serial Port pull down menu. Click on either Printer or Scoreboard, depending on what the serial port is connected to. Keep in mind when you select Scoreboard the Printer does not function. (See Fig. 4-81)

NOTE: For cable installation and pin out for the Serial Connection please see the HI 3000 Installation and Service manual, Cabling Section/Serial Port.

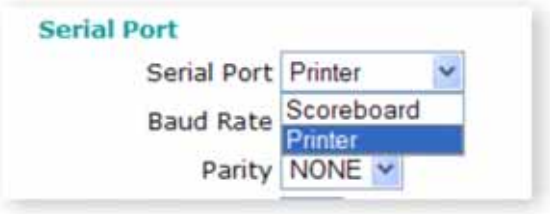


FIG. 4-77 CONFIGURING SERIAL PORT/PRINTER - SCOREBOARD

Step 33. Click on the Baud Rate pull down menu.

Step 34. Click on the Baud Rate your printer or scoreboard requires. (See Fig. 4-82)

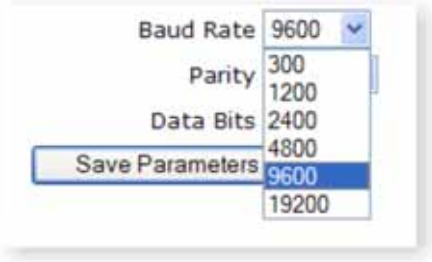


FIG. 4-78 CONFIGURING SERIAL PORT/BAUD RATE

Step 35. Click on the Parity pull down menu.

Step 36. Click on the Parity your printer or scoreboard requires. (See Fig. 4-83)

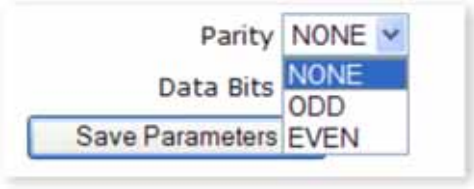


FIG. 4-79 CONFIGURING SERIAL PORT/PARITY

Step 37. Click on the Data Bits pull down menu.

Step 38. Click on 7 or 8 bits whichever you system requires. (See Fig. 4-84)

FIG. 4-80 CONFIGURING SERIAL PORT/ SELECTING 7 OR 8

Step 39. Click on the Save Parameters button to save the settings.

NOTE: You can click on the Save Parameters button anytime during this process. If you only change one parameter, click on the Save Parameters button. You must click on the Save Parameters button in order for the changes to occur.

NOTE: If you have changed the Control-Link Port Settings you need to cycle the power now.

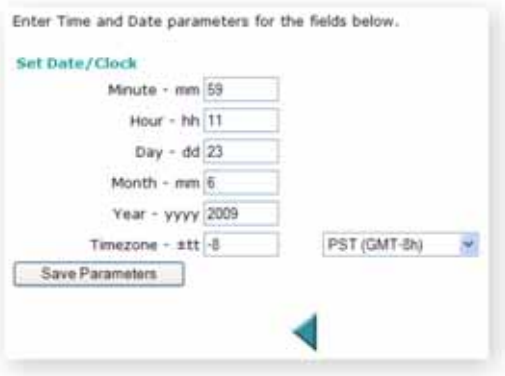


FIG. 4-81 INSTRUMENT SETUP/SET DATE/SET CLOCK/SET TIMEZONE

Set Date/Clock Parameters

Step 1. Double click in the Minute-mm field. Enter the current minutes. (See Fig. 4-85)

Step 2. Double click in the Hour-hh field. Enter the current minutes.

Step 3. Double click in the Day-dd field. Enter the current day.

Step 4. Double click in the Month-mm field. Enter the current month.

Step 5. Double click in the Year-yyyy field. Enter the Current year.

Step 6. Double click in the Timezone field. Check Table 4-2 Civilian Time Zones, GMT on page 40 for the time zone you are in. Enter the correct Greenwich Mean Time value. Don't forget to enter the positive (+) or negative (-) sign. For our example we used

the default time zone which is -8 or PST (Pacific Standard Time).

Step 7. Click on the Save Parameters button to save the setting.

The Instrument Configuration is complete

Options Configuration

Option Cards Configuration

Option Card Configuration Procedures can be found in the HI 3000 Series Operation and Installation Manual. Configuration Procedures for the Option Cards are common for all HI 3000 Series Products.

Rate of Change (-ROC) Option Configuration

ROC Configuration from the Front Panel

PARAMETER:TIMEMEASURE
RANGE: SEC, MIN, HRS
DEFAULT: SEC

PARAMETER:TIMEBASE
RANGE: 1-1800 SECONDS
DEFAULT: 1 SECOND

Step 1. From the Summary Display, press the up or down arrow buttons until the cursor is in front of the channel you want to configure for Rate of Change (ROC). (See Fig. 4-86)

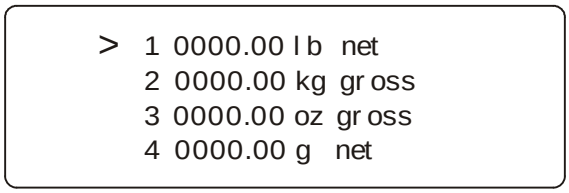


FIG. 4-82 SELECTING CHANNEL

Step 2. Press the Setup/3 button.
Step 3. The Configuration Menu appears. (See Fig. 4-87)

FIG. 4-83 SELECTING OPTIONS

Step 4. Press the up or down arrow buttons to move the cursor in front of Options.

Step 5. Press the Enter button. The Options Menu appears. (See Fig. 4-88)

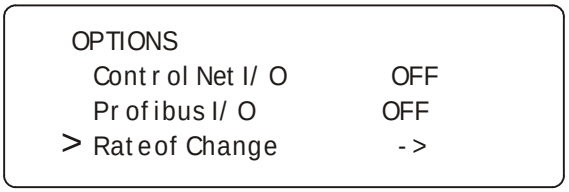


FIG. 4-84 SELECTING RATE OF CHANGE

Step 6. Press the up or down arrow buttons until the cursor is in front of Rate of Change. (See Fig. 4-88)

Step 7. Press the Enter button. The Rate of Change, Channel 1 Menu appears with the cursor in front of TimeMeasure. (See Fig. 4-89)

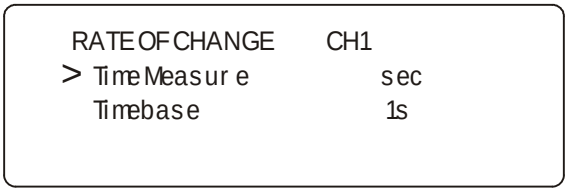


FIG. 4-85 RATE OF CHANGE, CH1/SETTING TIME MEASURE

Step 8. To set the TimeMeasure, press the left or right arrow buttons to select either seconds, minutes or hours. In our example we selected seconds. (See Fig. 4-89)

Step 9. Press the Enter button to set the entry.

Step 10. Press the down arrow button until the cursor is in front of Timebase.

Step 11. To set the Timebase, press the left or right arrow buttons to select the Timebase value. In our example we selected 1 second. (See Fig. 4-89)

Step 12. Press the Enter button to set the entry.

Step 13. Press the Exit button to return to the configuration Menu.

Step 14. To operate the Rate of Change please see the HI 3030 User Guide/Rate of Change for instructions.

Step 15. Tap on Enter to set the entry.

Step 16. Tap on Exit to return to the Configuration Menu.

ROC Configuration from the Browser

Step 1. From the HI 3030 Home Page, click on “Configuration”. (See Fig. 4-90) The Configuration page appears. (See Fig. 4-91)

FIG. 4-86 HI 3030 HOME PAGE/SELECTING CONFIGURATION

FIG. 4-87 CONFIGURATION MENU/SELECTING OPTIONS

Step 2. Click on Options. The Configuration - Options page appears. (See Fig. 4-92)

Step 3. Click on “Rate-of-Change Configuration”. (See Fig. 4-92) The Rate of Change page appears. (See Fig. 93)

FIG. 4-88 CONFIGURATION - OPTIONS/ SELECTING RATE-OF-CHANGE

FIG. 4-89 RATE OF CHANGE PAGE

Step 4. Click on the Channel pull down menu to select the channel Rate of Change you want to view. (See Fig. 93)

Step 5. Click on the channel number.

Step 6. To set the Time Measure click on the Time Measure pull down menu. (See Fig. 94)

Step 7. Click on the time measure you want.

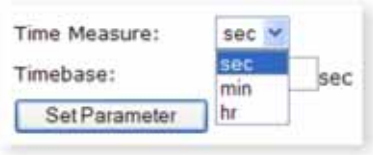


FIG. 4-90 RATE OF CHANGE/SELECTING TIME MEASURE

Step 8. To set the Timebase, double click in the Timebase text field. Type in the number you want the time it takes to run a Rate of Change evaluation. (See Fig. 4-95)

FIG. 4-91 RATE OF CHANGE/ENTERING THE TIMEBASE VALUE

Step 9. Click on the Set Parameter button to set the entry. (See Fig. 4-95)

Step 10. Click on the back arrow to return to the HI 3030 Home Page.

DeviceNet Parameters

About the DeviceNet Parameters

DeviceNet is a low-level network designed to connect the Weight Controller to higher-level controllers such as PCs, PLCs or embedded controllers.The DeviceNet Network is an open, global industry-standard communication network designed to provide an interface through a single cable from a programmable controller or PC directly to all HI 3000 Series products as well as smart devices such as sensors, push buttons, motor starters, simple operator interfaces, drives and other weight modules. With DeviceNet the user can monitor or control multiple applications from one display and allows 3rd party I/O to be easily added to any system. You no longer have to hard-wire each device to an I/O module or I/O block. The network also provides access to the intelligence present in the instruments for superior diagnostics and troubleshooting to help increase system up time. The DeviceNet network lets you monitor your plant-floor devices from a central location and reconfigure them as your needs change or service them as required. You can, for example, configure the Weight Controller modules for different applications.

PARAMETER:DEVICENET BAUD RATE
RANGE: 125K, 250K, 500K
DEFAULT: 125K

PARAMETER:DEVICENET NODE ADDRESS
RANGE: 0-64
DEFAULT: 0

Step 1. From the Options Menu press the Down arrow until the cursor is in front of DeviceNet. (See Fig. 4-96)

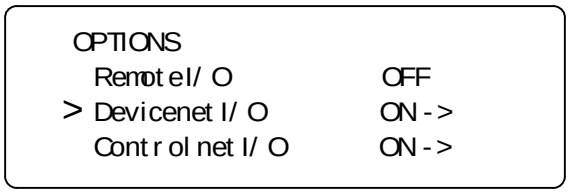


FIG. 4-92 OPTIONS MENU/DEVICENET

Step 2. Press the Enter button. The DeviceNet Menu appears with cursor in front of Baud Rate. (See Fig. 4-97)

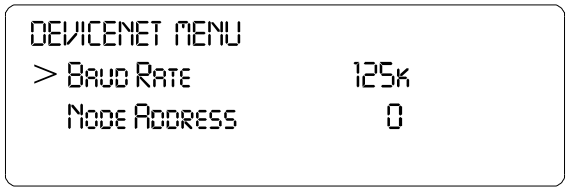


FIG. 4-93 DEVICENET MENU/BAUD RATE

Step 3. Press the right or left arrow buttons to select the Baud Rate you want.

NOTE: Check with your Network Administrator for the Baud Rate if you don't know the correct Baud Rate.

Step 4. Press the Enter button to set the entry.

Step 5. Press the Down arrow until the cursor is in front of Node Address. (See Fig. 4-98)

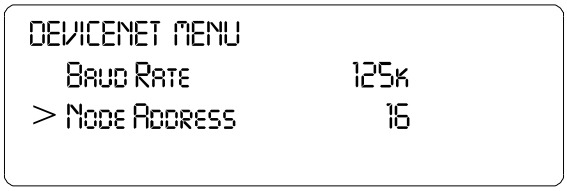


FIG. 4-94 DEVICENET MENU/NODE ADDRESS

Step 6. Press the right or left arrow buttons to select the Node Address.

Step 7. Press the Enter button to set the entry.

Step 8. Press the Exit button to return to the OPTIONS MENU.

Step 9. Press the Exit button to return to the Summary Display.

CHAPTER 5: CALIBRATION

About Chapter 5

Chapter 5 pertains to the calibration procedures for the HI 3030 Weight Controller. Alternatives to any procedures implied or explicitly contained in this chapter are not recommended. In order for the Weight Controller to work properly, it must be calibrated prior to operation. Be sure to follow all the procedures completely to insure that the weights read by the Weight Controller are accurate. It is very important that the user and service personnel be familiar with the procedures contained in this chapter, before installing or operating the HI 3030 Weight Controller.

Getting Started

The HI 3030 Weight Controller can be calibrated two ways. The first is the Hardy C2® Second Generation calibration which requires no test weights. Hardy C2® Calibration is one of the Core Technologies. We will describe the C2 Calibration process in this chapter. The second calibration technique is called the traditional calibration which requires certified test weights. It is important to note that the procedures contained in this section either explicitly stated or implied should be followed to guarantee the performance of the instrument. Alternatives to the procedures listed here are not recommended.

Before you can calibrate the instrument you first need to check to see if the system is ready to be calibrated.

Binding

Step 1. Due a visual check to see if the load cells have been installed so that nothing is binding the load cell or other parts of the weighing system. Make sure that nothing is draped over the scale or vessel such as a hose, electrical cord, tubes or other objects.

CAUTION: BINDING ON A SCALE/VESSEL OR LOAD CELL DOES NOT ALLOW THE LOAD CELL FREE VERTICAL MOVEMENT AND MAY PREVENT THE INSTRUMENT FROM RETURNING TO THE ORIGINAL ZERO REFERENCE POINT.

Step 2. Check to see that the load cell is mounted so that 100% of the load (Vessel with Contents) vertically passes through the load cell. (See Fig. 5-1)

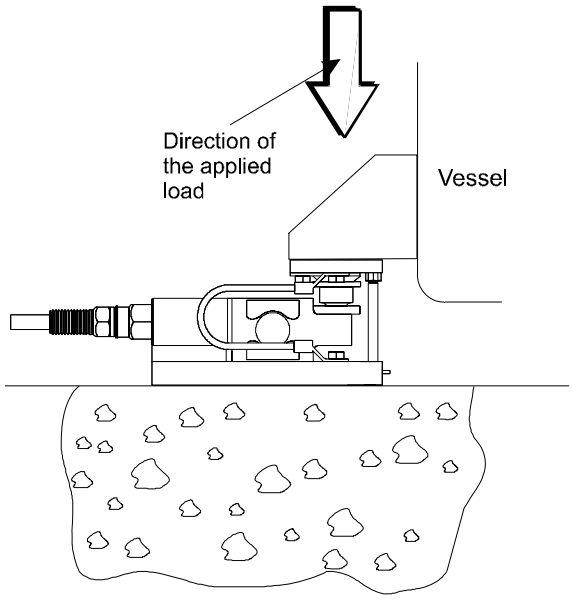


FIG. 5-1 PROPERLY INSTALLED LOAD CELL WITH NO BINDING

Electrical Check Procedures

Step 1. Check to see that there is power to the controller.

a. If there is power to the controller The front panel display should be lit.
b. If the display appears with a value the unit is ready for calibration.

Step 2. Check to see that all communication and power cables are securely fastened to the connectors on the rear panel.

C2 Calibration From the Front Panel

Step 1. Press the Setup/3 button. The Configuration Menu appears. (See Fig. 5-2)

Step 2. Press the down arrow until the cursor is in front of CALIBRATION. (See Fig. 5-3)

Step 3. Press the Enter button. The CALIBRATION Menu appears with the cursor in front of CAL TYPE C2. (See Fig. 5-3)

NOTE: If the cursor is in front of CAL TYPE TRAD, press the left or right arrow buttons until CAL TYPE C2 appears.

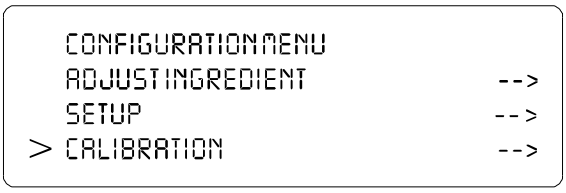


FIG. 5-2 CONFIGURATION MENU/SELECTING SETUP

FIG. 5-3 CALIBRATION MENU/C2 CAL

FIG. 5-4 CALIBRATION/SENSOR TYPE

CAUTION: FOR HARDY ADVANTAGE AND ADVANTAGE LITE C2 LOAD CELLS YOU MUST SELECT 0-3MV/V ONLY. SELECTING OTHER SENSOR TYPES WILL CREATE INCORRECT WEIGHT READINGS.

There are four (4) Sensor Type choices:

- 0-3mV/V - **C2 Load Sensors Only**
- ± 3mV/V - Non C2 Load Sensors
- 0-120mV/V - LVDT Type Load Sensors
- ± 120mV/V - LVDT Type Load Sensors

Step 4. Press the down arrow until the cursor is in front of Sensor Type.

Step 5. If the Sensor Type reads anything other than 0-3mV/V, use the left or right arrow to select 0-3mV/V.

Step 6. Press the Enter button. C2 CAL Sub-menu appears. (See Fig. 5-4)

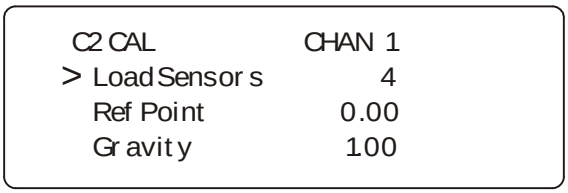


FIG. 5-5 C2 CALIBRATION SUB-MENU

Step 7. The Load Sensor number is a read only field. It tells you how many C2 load sensors are connected to the instrument. In our example there are 4 C2 load sensors connected to the instrument.

Step 8. Press the down arrow button to move the cursor in front of the Ref Point. (See Fig. 5-5)

a. The Reference Point is the total live load that is currently on the scale.
b. If you have nothing on the scale the Ref Point is 0. If you have 5 lbs live load on the scale the Ref Point is 5.

NOTE: Normally the scale system is clean and ready to receive product. This step establishes the gross zero reference.

FIG. 5-6 ENTERING THE REFERENCE POINT

Step 9. Press the Clr (Clear) button to clear the entry.

Step 10. Use the alphanumeric key pad to enter the weight that is currently on the scale, typically zero (0.00).

Step 11. Press the down arrow button to move the cursor in front of Gravity. (See Fig. 5-7)

About The Gravitation Correction Factor

Objects weigh less (about 0.5%) at the equator then they weigh at each pole because the force of gravity is less at the equator then at the North or South Pole. This is due in part to the effect of the earth's rotation and the shape of the earth at the equator. Therefore objects at the equator are 21 Km further from the Earth's center than objects at the poles. For example if you weigh 100 pounds at the North Pole on a spring scale you weigh 99.65 pounds at the equator. Depending on the latitude of your location you would weigh somewhere in between. For those who need the gravity correction factor you can set it here. The

table below shows the gravitation correction factor. In various cities around the world. Mexico City (1.002102) is the lowest and Oslo (0.998726) and Helsinki (1.001405) are the highest.

Table 1: Gravity Correction Factors

CITY	GRAV. ACCEL	CITY	GRAV. ACCEL
Amsterdam	0.999369	Los Angeles	1.001028
Athens	1.000684	Madrid	1.000461
Auckland NZ	1.000782	Manila	1.000461
Bangkok	1.002392	Mexico City	1.002102
Brussels	0.999503	New York	1.000433
Buenos Aires	1.001004	Oslo	0.998726
Calcutta	1.00191	Ottawa	1.000007
Cape Town	1.00104	Paris	0.999048
Chicago	0.99922	Rio de Janeiro	1.001884
Copenhagen	0.999075	Rome	1.000326
Nicosia	1.00093	San Francisco	1.000702
Jakarta	1.002631	Singapore	0.99877
Frankfurt	0.999579	Sydney	1.00104
Istanbul	1.000406	Taipei	1.001741
Havana	1.001872	Tokyo	1.000886
Helsinki	1.001405	Vancouver BC	0.999653
Kuwait	1.001405	Washington DC	1.000601
Lisbon	1.000615	Wellington NZ	0.999399
London	0.999445	Zurich	0.999821

In general if your location is between the 45th parallel and the equator the gravity correction is greater than 1.0. Because the gravity is less at these attitudes you are adding, for example 1.006 for an error that is .06%. For locations between the 45th parallel and the North or South Pole your correction factor is less than 1.0, for example .9994 for an error that is -.06%.

NOTE: You must perform a C2 Calibration after setting the Gravity Correction factor or the correction factor won't work.

NOTE: If you do not want to set the Gravity Correction Factor go to Step 16.

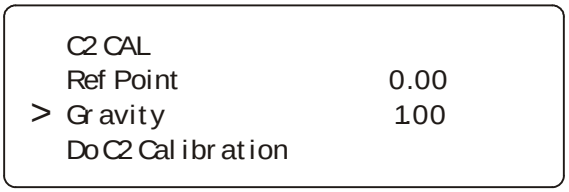


FIG. 5-7 GRAVITY CORRECTION FACTOR

Step 12. Press the Clear button to clear the entry. (See Fig. 5-8)

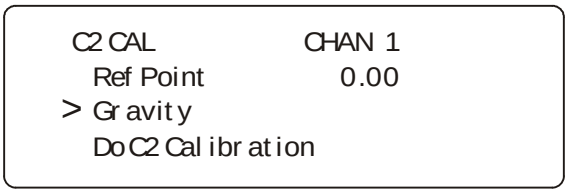


FIG. 5-8 GRAVITY/CLEARING ENTRY

Step 13. From the Gravity Correction Factors table select the city correction factor closest to your location.

Step 14. Use the keypad to enter the selected value. In our example we entered 1.002102 which is the correction factor for Mexico City. (See Fig. 5-9)

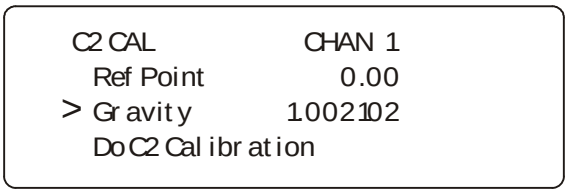


FIG. 5-9 GRAVITY CORRECTION FACTOR/ MEXICO CITY

Step 15. Press the Enter button to save the setting.

Step 16. Press the down arrow button to move the cursor in front of Do C2 Calibration. (See Fig. 5-10)

Step 17. Wait 15 seconds for the scale to settle.

Step 18. Press the Enter button to complete the Calibration.

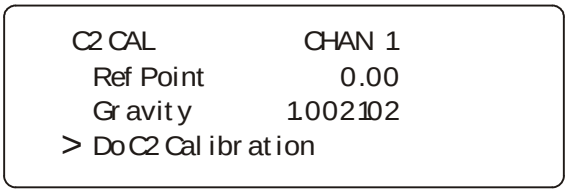


FIG. 5-10 C2 CALIBRATION

Step 19. A “function OK” momentarily appears on the screen indicating the calibration was successful

- A message that says “function Error” means that the calibration was not successful. Check Chapter 7 - Troubleshooting of this manual for corrective action.
- Another message may occur which is: Security Violation. This means that the User does not have the security level required to do a calibration.

Step 20. Press the Exit button until you return to the Standby display.

Step 21. C2 calibration is complete.

C2 Calibration From the Web Page

Step 1. On the Weight Controller Home Page Click on Configuration. (See Fig. 5-11) The Configuration page appears. (See Fig. 5-12)

FIG. 5-11 CONFIGURATION MENU/SELECTING SETUP

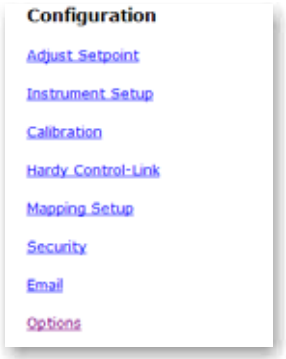


FIG. 5-12 CONFIGURATION PAGE

Step 2. Click on Calibration. The Calibration Sub-menu appears. (See Fig. 5-9)

Step 3. Click on the Channels pull down menu.

Step 4. Click on the Channel connected to the scale you want to calibrate.

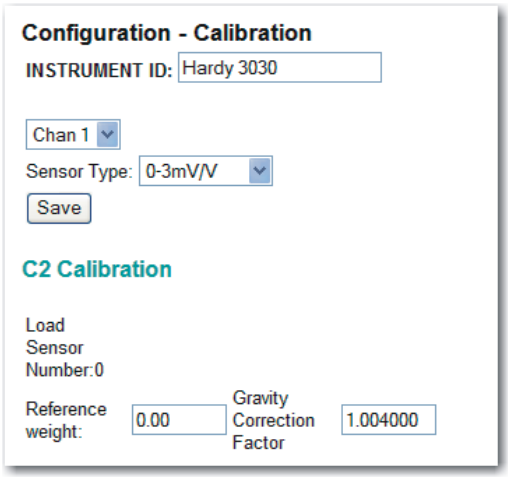


FIG. 5-13 C2 CALIBRATION SUB-MENU

Step 5. Click on the Sensor Type pull down list. (See Fig. 5-14)

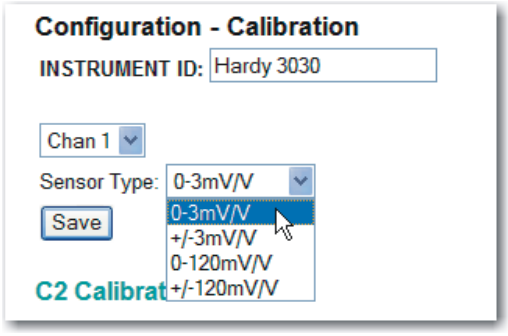


FIG. 5-14 CALIBRATION/SELECTING SENSOR TYPE

Step 6. Click on 0-3mV/V for C2 (Hardy Advantage and Advantage Lite) load sensors.

Step 7. The Load Sensor number is a read only field. It tells you how many C2 load sensors are connected to the instrument. If this number does not coincide with the actual number of load sensors go to Chapter 7 - Troubleshooting.

Step 8. To enter the Reference Weight click in the Reference Weight field. (See Fig. 5-9)

NOTE: The Reference Weight 0.000 is for demonstration purposes only. The recommended Reference Point should be 0.000.

a. The Reference Point is the total weight that is currently on the scale.
b. If you have nothing on the scale the Ref Point is 0. If you have 5 lbs on the scale the Ref Point is 5.

Step 9. Double click in the Reference weight text field.
Step 10. Use you keyboard to type in the new value. In our example we entered 0.00. (See Fig. 5-9)

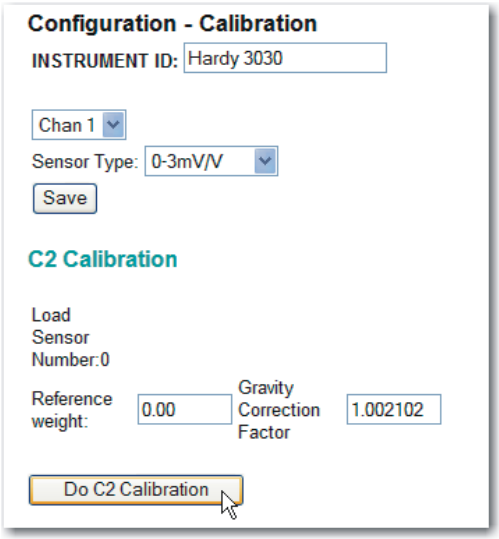


FIG. 5-15 CALIBRATION/ENTERING REFERENCE WEIGHT

Step 11. If you do not want to enter a gravity correction factor go to Step 15.
Step 12. If there is a gravity correction factor entered and you do not want to use a correction factor do the following:

- Double click in the Gravity Correction Factor text field.
- Enter 1.0, the value used for no correction factor.
- Go to Step 15.

Step 13. Go to the Gravity Correction Factors table on page 51. Select the correction factor of the city closest to your location.
Step 14. Type the correction factor in the Gravity Correction Factor text field. In our example we entered 1.002102 which is the correction factor for Mexico City. (See Fig. 5-15)
Step 15. Click on the Do C2 Calibration button.
Step 16. A page telling you that the C2 Calibration completed OK. (See Fig. 5-16)

FIG. 5-16 CAL COMPLETED OK

Step 17. Click on "Back" to return to the Calibration page.
Step 18. Click on "Home" to return to the Weight Controller Home page.
Step 19. C2 calibration is complete.

Traditional Calibration From the Front Panel

About Traditional Calibration

Traditional Calibration is the method of calibration that uses test weights. We recommend that the test weights total 80 to 100% of the scale live load capacity.

Step 1. Press the Setup/3 button. The Configuration Menu appears. (See Fig. 5-17)

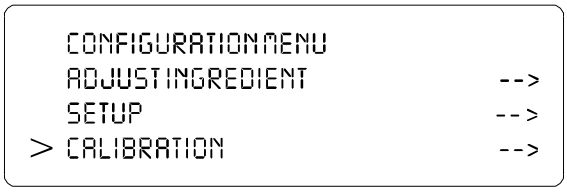


FIG. 5-17 CONFIGURATION MENU/CALIBRATION

Step 2. Press the down arrow until the cursor is in front of CALIBRATION. (See Fig. 5-17)
Step 3. Press the Enter button. The CALIBRATION Menu appears with the C2 Cal Type. (See Fig. 5-18)

NOTE: If the CALIBRATION MENU appears with Cal Type, TRAD go to Step 5.

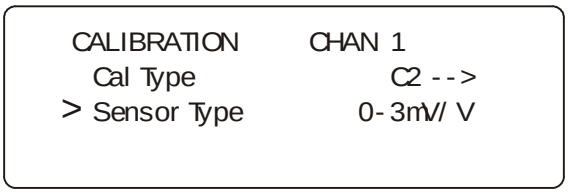


FIG. 5-18 CALIBRATION MENU

Step 4. Press the Right or Left arrow buttons to select Traditional Calibration. (See Fig. 5-19)

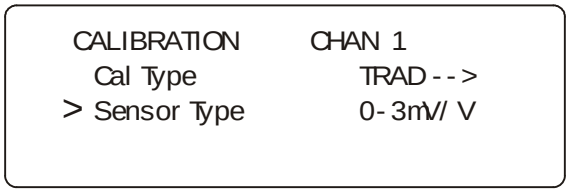


FIG. 5-19 CALIBRATION/TRADITIONAL

Step 5. Press the Enter Button. The Traditional Cal Menu appears with the cursor in front of Zero Value. (See Fig. 5-20)

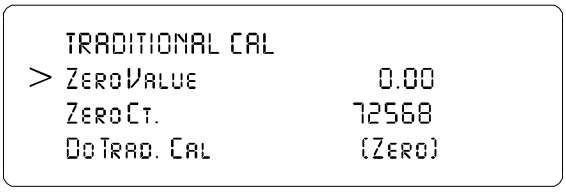


FIG. 5-20 TRADITIONAL CALIBRATION/ZERO VALUE

Step 6. Traditional Calibration requires a zero point and the physical placement of test weights on the scale. To Set the Zero Value:

- Remove all weight "live load" from the scale. The Zero Value should be 0.00.

CAUTION: THE SCALE MUST BE EMPTY.

- Wait 12 seconds or more.

NOTE: Zero Ct. is read only and is used to Troubleshoot the instrument. The Zero Ct. is always smaller than the Span Ct.

Step 7. Press the Down arrow button until the cursor is in front of the Do Trad Cal. (See Fig. 5-21)

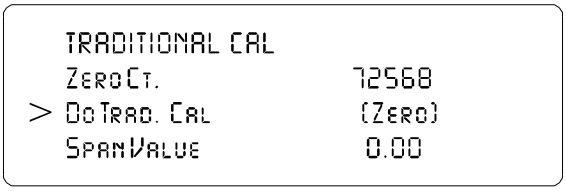


FIG. 5-21 DO TRADITIONAL CALIBRATION/ZERO

Step 8. Press the Enter button to do the Zero Calibration. If “Function OK” appears the Zero Calibration is complete If an ERR number appears go to Chapter 7, Troubleshooting for more information.

Step 9. Press the Down arrow button until the cursor is in front of Span Value. (See Fig. 5-22) To Set the Span Value:

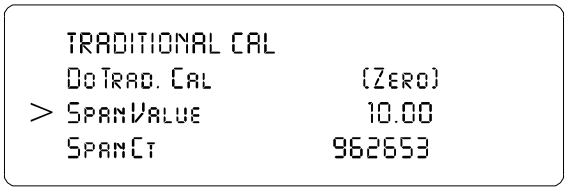


FIG. 5-22 TRADITIONAL CALIBRATION/SPAN VALUE

- Place a certified test weight on the scale.
- Use the alphanumeric key pad to enter the value of the test weight. (If a 10 lb.weight is used, enter 10).

NOTE: Ideally the test weight used for the span should be the highest weight that will be measured in the application.

- Wait 12 seconds or more.

Step 10. Press the Down arrow button until the cursor is in front of the Do Trad Cal. (See Fig. 5-23)

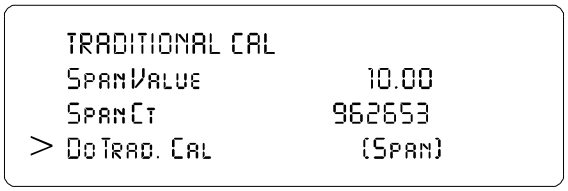


FIG. 5-23 TRADITIONAL CALIBRATION/SPAN

Step 11. Press the Enter button to do the Span Calibration. If “Function OK” appears the Span Calibration is complete If an ERR number appears go to Chapter 7, Troubleshooting for more information.

Step 12. End of Calibration

Traditional Calibration From the Web Page

Step 1. On the Weight Controller Home Page Click on Configuration. (See Fig. 5-24) The Configuration page appears. (See Fig. 5-25)

FIG. 5-24 CONFIGURATION MENU/SELECTING SETUP

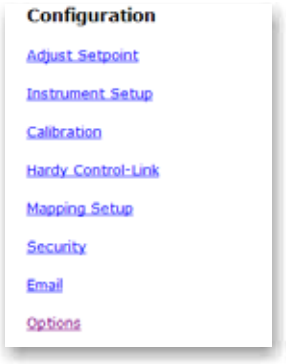


FIG. 5-25 CONFIGURATION PAGE

Step 2. Click on Calibration. The Calibration Sub-menu appears. (See Fig. 5-26)
Step 3. If necessary select the Sensor Type for this application.

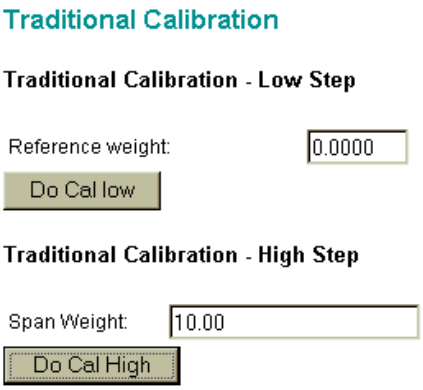


FIG. 5-26 CALIBRATION SUB-MENU

Step 4. If the Traditional Calibration - Low Step Reference is any value other than 0.0000 go to Step 4 otherwise go to Step 10.
Step 5. To clear the entry, move the cursor over the current Reference Weight which highlights the weight value.
Step 6. Use your keyboard to type in the new 0.0000 (See Fig. 5-26)
Step 7. Wait 12 seconds or more.
Step 8. Click on the Do Cal Low button.
Step 9. A page telling you that the Do Cal Low Calibration completed OK. (See Fig. 5-27)

FIG. 5-27 CAL LOW COMPLETED OK

Step 10. Click on "Back" to return to the Calibration page.
Step 11. Place a certified test weight on the scale.
Step 12. To enter the Span Weight click in the Span Weight field. (See Fig. 5-26)
Step 13. To clear the entry, move the cursor over the current Span Weight which highlights the weight value.
Step 14. Use you keyboard to type in the new value. In our example we entered 10.00. (See Fig. 5-26)
Step 15. Wait 12 seconds or more.
Step 16. Click on the Do Cal High button.
Step 17. A page telling you that the Do Cal High Calibration completed OK. (See Fig. 5-28)

FIG. 5-28 CAL HIGH COMPLETED OK

Step 18. Click on "Home" to return to the Weight Controller Home page.
Step 19. Traditional calibration is complete.

CHAPTER 6: MAPPING

About Mapping

Mapping is a simple process where you connect input (called a “Source”) to an output (called a “Destination”). The HI 3030 has four (4) output Relays and 5 Input Contacts. In addition you can map any of the parameters to the outputs and Inputs. The benefit of Mapping is that it requires no programming whatsoever. Simply select a Destination and a Source and your in business.

It is important to remember that the HI 3030 has four separate channels. You will have to set up your mapping for each channel. If you wanted all channels to Tare for example, you would have to select each channel and map Tare to an output relay.

Mapping to an HI 3030 with a pre-2.3 Firmware Version

The HI 3030’s with versions of firmware prior to 2.3 have UDP packets that are sent out regularly which have data at fixed locations. Some of these words correspond to words contained in the 2.3+ version, Hardy Control-Link Table as shown below:

2.3 Word	Pre 2.3 Contents
0	setpoints & motion word
1&2	Net Wt 1, floating point
3&4	Net Wt 2, Floating Point
5&6	Net Wt 3, Floating Point
7&8	Net Wt 4, Floating Point
9	Packet Sequence Number

TABLE 6-1: HI 3030

Therefore a version 2.3+ HI 3030 can pick up Net Wt channel 2 from a pre-2.3 HI 3030 node, let’s say Node 2 from 2FI1. Net Weight 2 at 2FI3. Net Wt 3 at 2FI5, Net Weight 4 at 2FI7.

Mapping to an Output Relay

In English we might say: “Connect the Setpoint Output to Relay Output #1.

- Relay Output #1 is the Destination.
- Setpoint Output is the Source.

In Assignment Statement form this mapping would look like this:

- Destination = Source or
- Output Relay #1 = Setpoint Output

Step 1. From the Filler/Dispenser Home Page click on Configuration. The Configuration Page appears. (See Figs. 6-1 and 6-2)

FIG. 6-1 SELECTING CONFIGURATION ON HOME PAGE

FIG. 6-2 SELECTING MAPPING SETUP

Step 2. Click Mapping Setup to display the Configuration Mapping Setup Page. The pull-down menus list all Destinations for the HI 3030. (See Fig. 6-3)

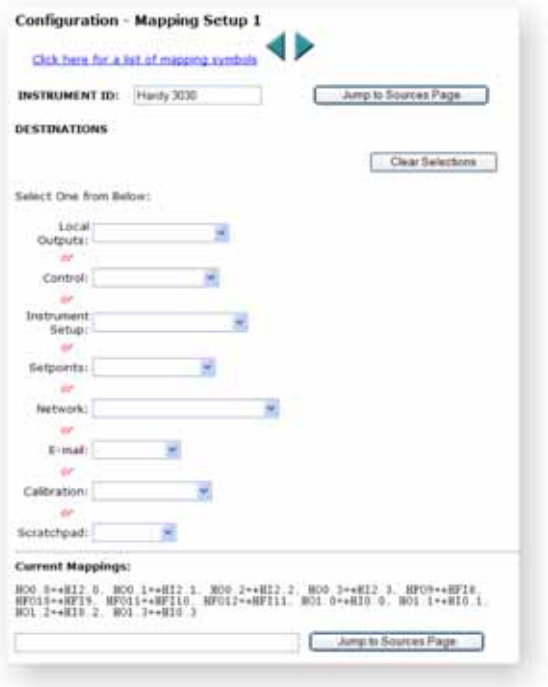


FIG. 6-3 CONFIGURATION MAPPING SETUP 1/ SELECTING A DESTINATION

Step 3. Let’s take a moment to take a look at this page.

- Local Outputs include the 4 Output Relays and a Software LED.

- Control includes parameters that control the instrument which includes the following which is only a partial list:

    1. Tare
    2. Zero
    3. C2® Calibrate
    4. Traditional Calibrate Low

NOTE: C2® is a registered trademark of Hardy Instruments Inc.

- Instrument Setup include parameters for setting up the instrument itself and includes the following which is only a partial list:

    1. WAVERSAVER®
    2. Grad Size
    3. Zero Tolerance
    4. Motion Tolerance

NOTE: WAVERSAVER® is a registered trademark of Hardy Instruments Inc.

- Setpoints includes setpoints for process control and includes the following which is only a partial list:

    1. Amount Required.
    2. Preact
    3. Dead Band
    4. Setpoint Weight Source

- Network includes the network outputs for Hardy Control Link, ControlNet, DeviceNet, Profibus etc. which is only a partial list.

    1. Hardy Control-Link Out
    2. Hardy Control-Link Int Out
    3. DeviceNet Text Out
    4. DeviceNet Int Out

- E-Mail includes E-Mail Outputs such as:

    1. Send E-Mail
    2. Custom Text

- Calibration includes calibration parameters:

    1. Do C2
    2. Span Weight
    3. Zero Weight
    4. Zero Counts

- Scratchpad which are empty registers you can do whatever you want with.

NOTE: The lists above do not include all the parameters. For a list of all the parameters and their addresses please see Appendix A.

Step 4. Back to our example. We want to select Output Relay #1 as our destination. Click on the Local Outputs pull down menu. (See Fig. 6-4)

Step 5. Click on Output Relay. After you click on Output Relay it is selected and a Number and a Select button appear to the right of the Local Outputs pull down menu. (See Fig. 6-4)

Step 6. To select Output Relays from 1 - 4, double click in the text box and type in the Output Relay number you want. In our example we selected Output Relay #1. (See Fig. 6-4)

FIG. 6-4 LOCAL OUTPUT/SELECTING OUTPUT RELAY #1

Step 7. Click on the Select button to the right of the Relay #1 text box. An address appears in the Current Mappings text box below. You will have to scroll down to see it. In our example we selected Output Relay #1 which has an address of: HO0.0. An equal "=" sign also appears.

Current Mappings:
HO0.0=HI2.0, HO0.1=HI2.1, HO0.2=HI2.2, HO0.3=HI2.3, HFO9=HFI8, HFO10=HFI9, HFO11=HFI10, HFO12=HFI11, HO1.0=HI0.0, HO1.1=HI0.1, HO1.2=HI0.2, HO1.3=HI0.3
HO0.0=
Jump to Sources Page

FIG. 6-5 OUTPUT RELAY #1 ADDRESS HO0.0

Step 8. You have now selected the Destination.

Step 9. Click on the Jump to Sources Page button to select the Source you want for this destination. (See Fig. 6-5) The Configuration, Mapping Setup 2 page appears. (See Fig. 6-6)

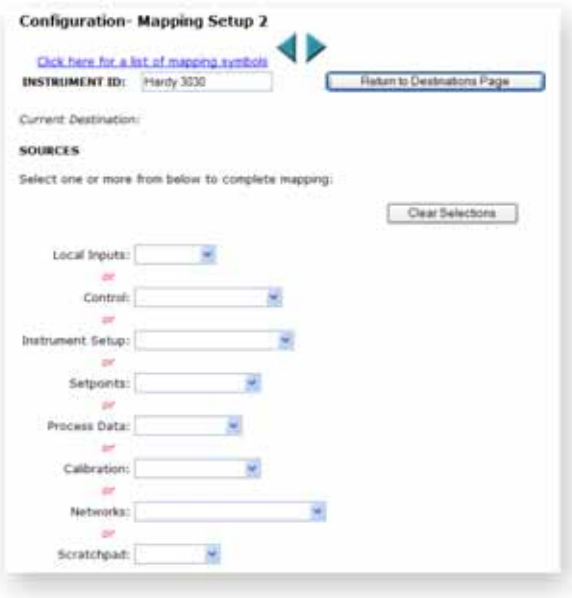


FIG. 6-6 CONFIGURATION - MAPPING SETUP 2

Step 10. Lets take a moment to look at this page.

- Local Inputs include the 5 input contact closures provided by the HI 3030.
- Control includes the following which is only a partial list:

  1. Setpoint Output
  2. Scale in Motion
  3. ADC Error
  4. Discharge

- Instrument Setup includes parameters for setting up the instrument itself and includes the following which is only a partial list:

  1. Zero Tolerance
  2. Decimal Point
  3. Setup Menu Security
  4. Firmware Revision

- Setpoints include the following which is only a partial list:

  1. Amount Required
  2. Preact
  3. Deadband
  4. Setpoint Weight Source

- Process Data includes all the process parameters and includes the following which is only a partial list:

  1. Gross Weight
  2. Net Weight
  3. Peak Weight
  4. Tare Weight

- Calibration includes calibration parameters:

  1. Zero Weight
  2. Span Weight
  3. Calibration Type

- Network includes the network outputs and inputs for Hardy Control Link, ControlNet, DeviceNet, Profibus etc. which is only a partial list.

  1. Hardy Control-Link Short Int In
  2. Hardy Control-Link Int Out
  3. DeviceNet Text Out
  4. DeviceNet Int In

- Scratchpad which are empty registers you can do whatever you want with.

NOTE: The lists above do not include all the parameters. For a list of all the parameters and their addresses please see Appendix A.

Step 11. Back to our example. We want to select Setpoint Output which is a control parameter. Click on the Control pull down menu. (See Fig. 6-7)

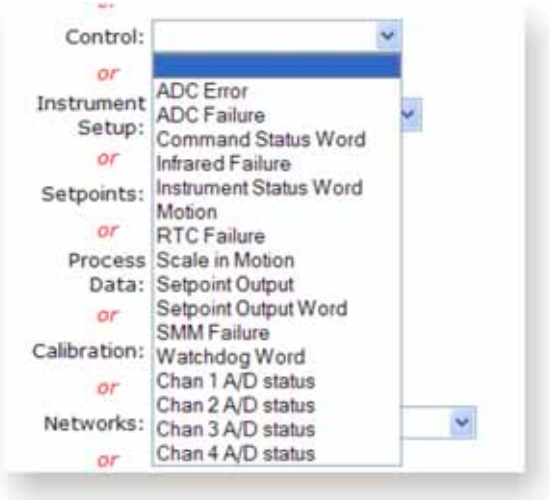


FIG. 6-7 CONTROL PULL DOWN MENU/ SELECTING SETPOINT OUTPUT

Step 12. Click on “Setpoint Output.” A Select button appears to the right of the Control pulldown menu. (See Fig. 6-8)

Step 13. Double Click in the Setpoints text field and type in the Setpoint number you want. The range is 1-12. In our example we selected Setpoint #1.

FIG. 6-8 CONTROL PULL-DOWN MENU/ENTERING SETPOINT OUTPUT

Step 14. Click on the Select button to select Setpoint Output #1 as the Source.
Step 15. The Assignment Statement is complete. You will now see in the Current Mappings text box: HO0.0=HI2.0
Step 16. Click on the Map button. You have now mapped Setpoint Output #1 to Output Relay #1. Notice that the new mapping is included in the list of current mappings. (See Fig. 6-9)

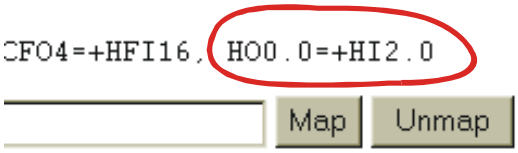


FIG. 6-9 MAPPED SETPOINT OUTPUT #1 TO OUTPUT RELAY #1

Example #2 Mapping an Input

There are 5 contact closure inputs designed into the HI 3030. You want to map Input Contact #4 to Tare. Our Assignment Statement is:

- Destination = Source
- Tare (HO1.0) = Input #4 (HI0.3)

Step 1. On the Configuration - Mapping Setup 1 Page click on the Control pull down menu. (See Fig. 6-10)

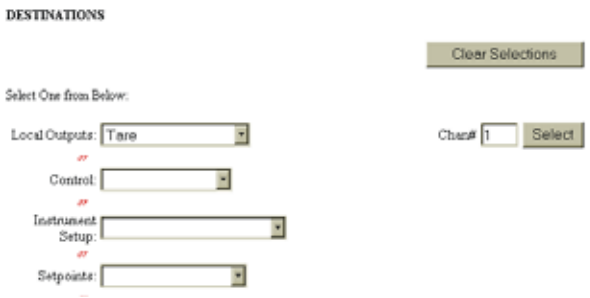


FIG. 6-10 DESTINATION/TARE

Step 2. Click on Tare. A Select button appears. (See Fig. 6-10)
Step 3. Click on the Select button. (See Fig. 6-10) The Destination address appears. (See Fig. 6-11)

FIG. 6-11 TARE (HO1.1) SELECTED AS A DESTINATION

Step 4. Click on the "Jump to Sources Page" button. The Configuration - Mapping Setup 2 page appears. (See Fig. 6-12)

FIG. 6-12 CONFIGURATION - MAPPING SETUP #2 PAGE/SELECTING LOCAL INPUT #4 AS THE SOURCE

Step 5. Click on the Local Inputs pull down menu. Click on Local Inputs. An Input# text box appears with a Select button to the right. (See Fig. 6-12)
Step 6. Double Click in the Input# text box and type in the number 4.
Step 7. Click on the Select button.
Step 8. The Mapping Assignment Statement is complete. (See Fig. 6-13) Tare (HO1.0) = Input contact #4 (HI0.3)

FIG. 6-13 COMPLETED ASSIGNMENT STATEMENT

Step 9. Click on the Map button. The Input Contact #4 is now mapped to Tare. (See Fig. 6-14)

FIG. 6-14 INPUT CONTACT #4 MAPPED TO TARE

Mapping Multiple Sources

Now that you know how to map a single source to a destination we can move onto multiple sources mapping. Lets say you want to energize or de-energize Output Relay #3 if you have two scales. Whenever Scale #1 finishes weighing you want to energize a visual signal such as a light indicating to the operator that Scale #1 is finished, remove the weight. The same for Scale #2. You want one Output Relay to energize or de-energize if either one of two conditions exist. Lets map the multiple sources to Output Relay #3.

Our Assignment Statement looks like this:

Destination = Source 1 + Source 2

Output Relay #3 = Scale #1 + Scale #2

In this Assignment Statement we use a boolean operator. "+" which in boolean Assignment Statements mean "or". This means that if either of the scales is finished weighing, Relay #3 will be energized or de-energized, depending on what you want the relay to do. Here's the process:

Step 1. From the Configuration - Mapping Setup #1 page, click on the Local Output pull down menu and select Output Relay. (See Fig. 6-15)
Step 2. In the Relay# text field type number 3.

FIG. 6-15 MAPPING SETUP #1 PAGE/SELECTING OUTPUT RELAY #3

Step 3. Click on the Select button to select the Destination - Output Relay #3.

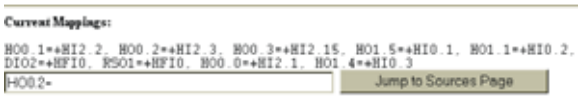


FIG. 6-16 OUTPUT RELAY #3 (HO0.2) ENTERED IN THE ASSIGNMENT STATEMENT AS A DESTINATION

Step 4. Click on the "Jump to Sources Page" button. (See Fig. 6-16) The Mapping Setup #2 Page appears. (See Fig. 6-17)

FIG. 6-17 ALARMS/SELECTING OVERFILL ALARM

Step 5. Click on the Setpoints pull down menu. Select Setpoints Wt Source. (See Fig. 6-17)
Step 6. Double Click in the Setpoint# field and enter the number of the Setpoint Weight Source you want. The range is from 1 - 12. In our example we selected #1 for Scale #1.
Step 7. Click on the Select button to the right of the Alarms pull down menu. (See Fig. 6-17) The Setpoint #1 address appears in the Assignment Statement to the right of the equals sign which means it is a Source. (See Fig. 6-18)

Current Mappings:
HO1.0=+HI0.3
HO0.2=HFO9=
Map
Unmap
Operators:
Equals
The "=" equates a single Destination with one or more Sources
And
The "*" Provides the Boolean AND or the Analog TIMES Operator between Sources
Or
The "+" Provides the Boolean OR or the Analog PLUS Operator between Sources
Not
The "~" Provides the Boolean NOT or the Analog MINUS Operator between Sources
Comma
The "," is used to concatenate mapping equations.
Mapping Symbols: Click here to view a list of mapping symbols

FIG. 6-18 SETPOINT #1 (HFO.9) ENTERED IN THE MAPPING ASSIGNMENT STATEMENT

Step 8. To add another Source to the Assignment Statement and make it a Boolean "or" Statement, click on the "Or" button below the Assignment Statement. A "+" plus sign appears to the right of the Setpoint #1 Address. (See Fig. 6-18)
Step 9. Click on the Setpoints pull down menu. (See Fig. 6-19)
Step 10. Select Setpoint Wt Source #2.

FIG. 6-19 SETPOINTS/SELECTING SETPOINT WT SOURCE #2

Step 11. Click on the Select button to the right of the Setpoints# field to add the "Setpoint Wt Source #2" to the Assignment Statement. (See Fig. 6-20)

FIG. 6-20 SETPOINT WT SOURCE #1 (HFO10) ADDED AS THE SECOND SOURCE TO THE ASSIGNMENT STATEMENT

Step 12. Click on the Map button to save the mapping. The multiple source map appears in the Current Mappings listing. (See Fig. 6-21)

FIG. 6-21 MULTIPLE SOURCE MAP

Step 13. You have now mapped multiple sources to a single destination.

Simple Network Mapping

Mapping to a Network Output

If you want to send data to a PLC from the HI 3030 you need to map the data to a network output. Here is the process:

Step 1. From the Configuration - Mapping Setup #1 page, click on the Network pull down menu and select DeviceNet Boolean Out. (See Fig. 6-22)

FIG. 6-22 NETWORK/SELECTING DEVICENET BOOLEAN OUT

Step 2. Double click in the Word text box and type in the number 2.
Step 3. Double click in the Bit text box and type in the number 3.
Step 4. Click on the Select button to set the Destination. The "DeviceNet Boolean Out" address appears on the left side of the Assignment Statement. (See Fig. 6-23)

FIG. 6-23 DEVICENET BOOLEAN OUT (DO2.3) SET AS DESTINATION

*NOTE: The DeviceNet Boolean Out address DO2.3 means the following. DO = **D**eviceNet **O**ut. 2.3 = Word 2, Bit 3.*

Step 5. Click on the "Jump to Sources Page" button. The Configuration - Mapping #2 page appears.

FIG. 6-24 PROCESS DATA/SELECTING GROSS WEIGHT CHANNEL 1

Step 6. Click on the Process Data pull down menu. (See Fig. 6-24)
Step 7. Click on Gross Wt. (See Fig. 6-24)
Step 8. Click in the text field next Chan and enter the channel you want. In our example we selected Channel #1.
Step 9. Click on the Select button to enter Gross Wt, Channel #1 as the source of the Assignment Statement.
Step 10. The Gross Wt address appears on the right side of the Assignment Statement. (See Fig. 6-25)

FIG. 6-25 ASSIGNMENT STATEMENT MAPPING GROSS WEIGHT, CHANNEL #1 (HF14) TO DEVICENET INT OUT (DO2.3)

Step 11. The Gross Weight is now available to the PLC via the DeviceNet Scanner. (See Fig. 6-26)

FIG. 6-26 SIMPLE NETWORK MAP/GROSS WEIGHT TO DEVICENET BOOLEAN OUT

Mapping a Network Input to a Local Output

If you want a PLC to send instructions to an HI 3030 you will have to map the local Output to a network input. Here is the process:

NOTE: Keep in mind that the network input on the HI 3030 will now be the source for the PLC output. This enables the PLC to send instructions to the network input on the HI 3030 and in turn to the HI 3030 output.

Step 1. From the Configuration - Mapping Setup #1 page, click on the Local Outputs pull down menu and select Output Relay. (See Fig. 6-27)

FIG. 6-27 LOCAL OUTPUT/SELECTING OUTPUT RELAY #2

Step 2. Double click in the Relay# field and type the number 2.
Step 3. Click on the Select button to select Output Relay #2 as the Destination for the left side of the Assignment Statement. (See Fig. 6-28)

FIG. 6-28 OUTPUT RELAY #2 (HO0.1) SET AS DESTINATION

Step 4. Click on the "Jump to Sources Page" button. The Configuration - Mapping #2 page appears.
Step 5. Click on the Networks pull down menu. (See Fig. 6-29)

FIG. 6-29 NETWORK/SELECTING DEVICENET BOOLEAN IN

Step 6. Click on "DeviceNet Boolean In" to select it as the Source for the Assignment Statement. (See Fig. 6-29)
Step 7. Click in the Word text box and type in the number "2".
Step 8. Click in the Bit text box and type in the number "2"
Step 9. Click on the Select button to save the source.

FIG. 6-30 ASSIGNMENT STATEMENT MAPPING DEVICENET INT IN (DIO2) TO OUTPUT RELAY #2 (HO0.1)

Step 10. Now whatever is sent to Devicenet Boolean In from the Network will be sent to Output Relay #2.

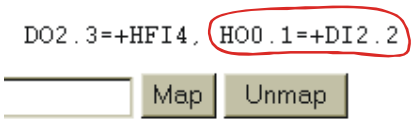


FIG. 6-31 DEVICENET BOOLEAN IN CONNECTED TO OUTPUT RELAY #2 OUT

More Advanced Mapping

This section is for those who have some or a lot of experience Addressing I/O (mapping) or for those who want more information as to how the mapping works locally and on the network. We go into much more detail as to how the mapping works and include instructions for Boolean, Analog, Mixed and Special Command mapping procedures.

Mapping is similar to Addressing I/O's in a PLC except there are no predefined mappings in the HI 3000 Series Instruments and you are not mapping the physical location of an I/O module terminal to a bit location in the processor, you are actually mapping values or states in memory to another memory location. This difference is important to understand and will be explained later in this chapter. In order to understand Mapping we first need to define some of the terms and understand the structure of an Assignment Statement.

In short mapping is nothing more than assigning data from an address (Source) to another address (Destination) to be used by the controller in ways that meet your process requirements. Since the HI 3030 does not have any predefined Addressed I/O you are free to Address I/O in any fashion that meets your needs.

Glossary of Mapping Terms

Assignment Statement - The assignment statement is an order to the computer to change the value stored in the variable (Memory Address) on the left-hand side of the assignment operator (i.e. the = sign). For example: i = a + b, means get the value stored in "a" and add it to the value stored in "b" and store the sum value at memory address "i". The left hand side of the operator sign (=) is the address where you want the values on the right hand side of the operator sign (=) to be stored.

Destination - This is the destination memory address to which data will be moved. Left Hand Side

I/O Interface - The section of the instrument that communicates with the "outside world".

Input Contact - Inputs interface selector switches, push buttons, limit switches and other sensors to the HI 3030. Each input has an address associated with it which describes the physical location that the input device is connected to.

Input Image Table - A data table containing addressed memory where the states of the input devices and parameter values are stored. The state of each input device is transferred to the input image table from the input point during the I/O scan.

Local Mapping - This is mapping within an HI 3030 Filler/Dispenser module, primarily mapping internal memory locations of parameter values or device states to locations in the local Input Image Table or Output Image Table.

Network Mapping - This is mapping between the master and slave devices in the case of a DeviceNet, ControlNet, RIO or Profibus network. Hardy Control Link network mapping is mapping between nodes on the network.

NOTE: It is important to understand that you cannot perform mapping functions on one HI 3000 Series Instrument from another HI 3000 Series instrument. You must map the memory locations in each instrument separately. More will said about this later.

Node Number - This is the physical address of a device in a network.

Output Relay - Outputs interface indicators, motor starters, solenoids, and other actuators from the HI 3030. Each output has an address associated with it. The address describes the physical location that the output device is connected to.

Output Image Table - The data table containing addressed memory where the desired state of the output devices and parameter values are stored. The desired state or parameter value of each output is transferred from the output image file to the output point during the I/O scan.

Source - This is the memory address of the data you want to move to the destination. Right Hand Side

Rules for Hardy Control Link Mapping

Some rules for Hardy Link Basic Mapping:

- Input Contacts (5 total) can only be a Source.
- Output Relays can be a Source and a Destination.

Local Input

Inputs interface with selector switches, push buttons, limit switches and other sensors connected to the HI 3030. When the firmware is initiated it assigns the physical input contact to a memory address (Remember Inputs can only be a Source when mapping. (See Source definition in the Glossary of Mapping Terms)

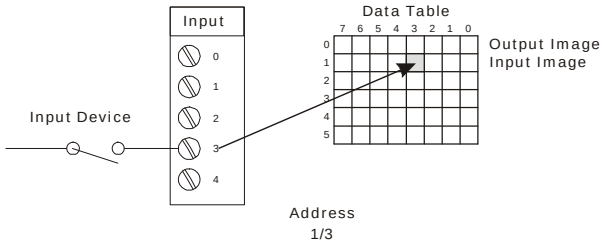


FIG. 6-32 INPUT FUNCTION

- Each input has an address associated with it.
- The address describes the physical location that the input device is connected to.
- The address also describes the Input Image Table location where the STATE of the input device is stored.
- The state of each input is transferred to the Input Image File from the input point during the I/O scan every 1/55th of a second. (See Fig. 6-1)
- When you are mapping an Input to some other Destination you are assigning the value in the Input Image Table (for that Input) to an Address in the Output Image Table.
- For example: **OK TO FILL = Contact closure input #5** means assign the state (Open (0) or Closed (1)) of Contact #5, contained in the Contact Closure input #5 memory address, in the Input Image Table and move it to the OK TO FILL address in the Output Image Table. (See Fig. #6-1)

Local Output

Outputs interface with indicators, motor starters, solenoids, and other actuators connected to the HI 3030. Remember Outputs can be a Destination and a Source. (See Destination definition in the Glossary of Mapping Terms)

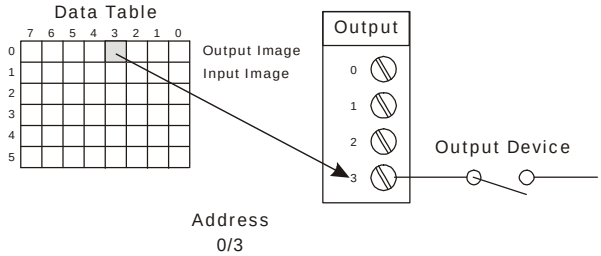


FIG. 6-33 OUTPUT FUNCTION

- Each output has an address associated with it.
- This address describes the physical location that the output device is connected to.
- This address also describes the data table location where the desired state of the output device is stored.
- The desired state of each output is transferred from the output image table to the output point during the I/O Scan every 1/55th of a second. (See Fig. 6-2)
- For Example: **Relay out #3 = FAST FILL** means assign the desired state (Open (0) or Closed (1)) located at the Fast Fill Address in the input image table and move it to the Relay out #3 address in the Output Image Table. (See Fig. 6-33)

Volatile and Non-Volatile Memory

It is important to understand that the data stored in the Output and Input Image Tables is stored in volatile memory. This means, when you power off you lose the data. The Addressing I/O (Mapping) is saved in non-volatile memory and is not lost when you power off.

A Definition of Mapping

Mapping (Addressing I/O) is the same as using an Assignment Statement. The Destination is located on the left hand side of the equals (=) sign and is a memory address (variable). The Source is the data located on the right hand side of the equals (=) sign at a memory address. So when you refer to the right hand side of the Assignment Statement you are referring to the data only and not the address even though the address is listed.

- Memory Address (Variable) = Data (Values, states)

The equals (=) sign assigns the data on the right side of the Assignment Statement to the Memory Address on the left side of the Assignment Statement.

This is exactly what you are doing when you map a source to a destination.

The things that can be mapped are organized into Input Image Tables and Output Image Tables, which are arrays of variables (i.e. memory locations of a certain size based on the type assigned to the variable) with addresses where data is stored.

A table is called an “output” image table if the items in the table are permitted to be on the left hand side of an Assignment Statement. The Output variables are also further identified by the first two letters of the variable:

- HO - Hardy Output Image Table
- DO - DeviceNet Output Image Table

- RO - RIO Output Image Table
- CO - ControlNet Output Image Table or Profibus Output Image Table.

NOTE: You won't use ControlNet and Profibus at the same time so they can both use the same tables.

If the items in the table are only permitted on the right hand side of an Assignment Statement, we call it an "input" image table:

- HI - Hardy Input Image Table
- DI - DeviceNet Input Image Table
- RI - RIO Input Image Table
- CI - ControlNet Input Image Table or Profibus Output Image Table.

For example, the digital inputs on the Filler/Dispenser are found in an input image table, as are the items in the DeviceNet input image table.

The HI 3030 scans through the I/O image tables 55 times a second and reads any values that are contained in the tables. If there is nothing stored in the tables the controller does nothing with it. If there are state values or other values stored in the tables, the firmware processes the data and outputs it to an output device or the screen.

Local Mapping Example

Local Mapping Output

You hardwired a Valve Actuator to Output Relay #1. When the Filling process gets an OK to Fill the Filler changes the Fast Fill value (which is stored in the Input Image Table) from 0 to 1 which means, close the output relay to begin a fast fill. You need to map the Fast Fill to Output Relay #1.

The Destination is Output Relay #1 a State value that is located in the Output Image Table at Address HO0.0.

The source is the Fast Fill value that is stored in the Fast Fill memory address (HI2.1) in the Input Image Table. Do not confuse the value with the address.

So now you have a Destination Address to which you can assign the Source value.

My Assignment Statement is:

HO0.0 = HI2.1

Output Relay = Fast Fill

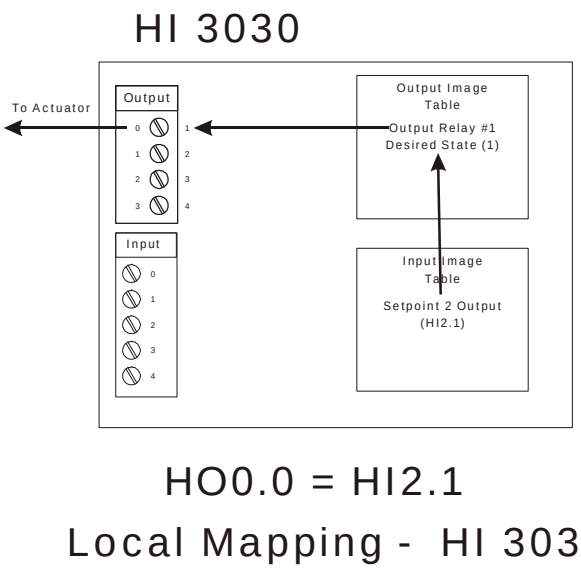


FIG. 6-34 MAPPING SETPOINT 2 OUTPUT TO OUTPUT RELAY #1

As the instrument scans the Input Image Table it sees the new state value (close = 1) for Setpoint 2 Output which was set by the instrument's firmware. It takes the new state value (1) and sends it to the Output Relay #1 address on the Output Image Table and sets the desired state for the relay to 1 which simultaneously closes the relay that opens the actuator for a valve to begin a Setpoint 2 Output.

Network Input

PLC's also have Input Image Tables and Output Image Tables. The HI 3030 is a node in a total network and you assign the HI 3030 Filler/Dispenser a node address so the Network scanner can identify the instrument.

WARNING: YOU CANNOT ASSIGN THE SAME ADDRESS TO TWO DIFFERENT NODES. THE PLC CANNOT DETERMINE WHICH NODE IT IS COMMUNICATING WITH. THIS CAN RESULT IN PROPERTY DAMAGE OR PERSONAL INJURY.

The Network scanner, scans each node's Output Image Table to read the values that are located there. If there are values in the nodes' Output Image Table it reads the values to the PLC's Input Image Table which makes the data available to the PLC for processing.

Here again you can assign the data in the node's output image table to an address in the PLC input image Table. So if you want the net weight to be displayed in the PLC's output (screen) you have already assigned the Net Weight value located in the Input Image Table to the Output Image Table. The PLC Scanner reads the Net Weight value in the nodes's Output Image Table and moves the value to a word location

in the Input Image Table on the PLC. The Input Image Table Net Weight value is then output let's say to the PLC screen.

Network Output

When the Network Scanner writes values to the nodes it does this by taking the data located in the PLC Output Image Table and writes the values to another nodes' Input Image Table. Once the value is in the node's Input Image Table it becomes a source and can be mapped to any destination in the HI 3030. (See Fig. 6-35)

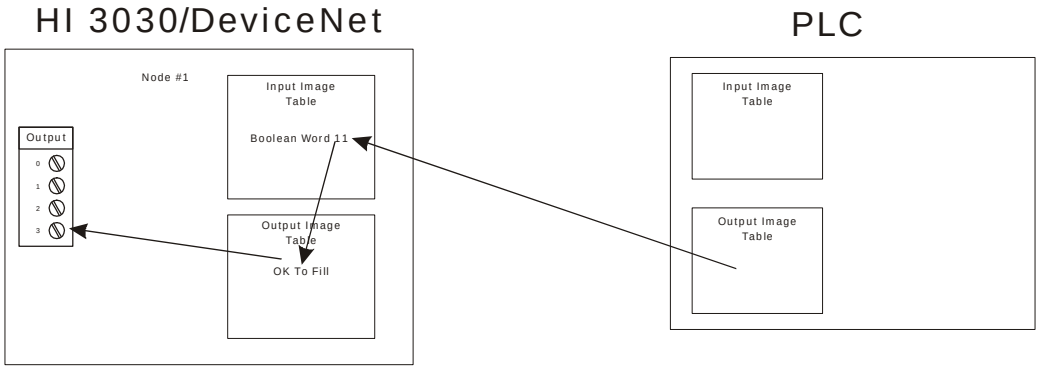


FIG. 6-35 DEVICENET OUTPUT

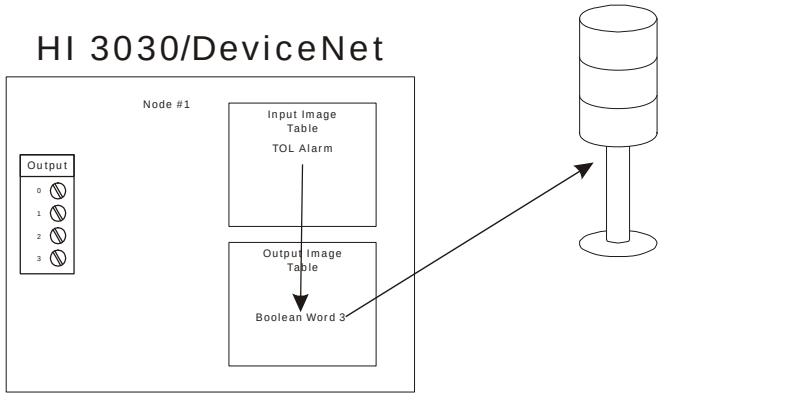


FIG. 6-36 DEVICENET OUTPUT

Hardy Control Link Network Mapping

If an HI 3030 Node #1 does not have any Output Relays available, you can select another node's Output Relay. HI 3030, Node #2 has an output relay available. This requires that you first map Node #1 and Node #2 separately so that the input contact in Node #1 can be mapped directly to the Output Relay in Node #2. (See Fig. 6-37)

Step 11. You need to set up communication between Node #1 and Node #2. You can do this by going to the HI 3030 Web Page, select Configuration, select Hardy Control-Link. For complete instructions to setup communications between instruments go to the HI 3000 Installation and Operation manual, Hardy Control-Link Ethernet Network, Setting Node Addresses for HI 3000 Series Instruments from the Browser.

Step 12. At node #2 you need to map the Output Relay #3 state value, in the Output Image Table to the Hardy Boolean In address in the Input Image Table. (See Fig. 6-6 Green Arrows)

Step 13. At node #1 you need map Input Contact #1 in the Input Image Table to Hardy Boolean Out in the Output Image Table. (See Fig. 6-37 Red Arrows)

Step 14. Now that you have set up the local mapping for Node #1 and Node #2 and Node #1 is communicating with Node #2 you can map the Input Contact at Node #1 directly to the Output Relay at Node #2. (See Fig. 6-37 Black Arrow)

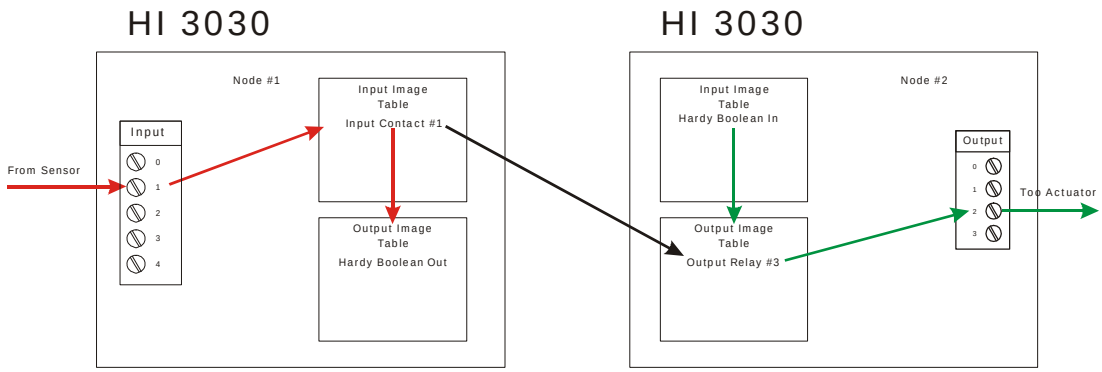


FIG. 6-37 HARDY CONTROL LINK NETWORK MAPPING

Boolean Mapping

A Boolean variable is a variable that can have the value 0 (FALSE) or 1 (TRUE). In the HI 3030 Filler/Dispenser there are 3 boolean operations supported:

- AND - The symbol for “AND” in a Boolean Assignment Statement is “*”.
- OR - The symbol for “OR” in a Boolean Assignment Statement is “+”.
- NOT - the symbol for “NOT” in a Boolean Assignment Statement is “~”.

The Boolean image tables are arrays of short (2 byte) integers. An individual Boolean variable in the image table is located by its word offset and its bit offset. Boolean image tables are given 2 letter names as follows:

- DI is the DeviceNet input image table.
- DO is the DeviceNet output image table.
- HI is the Hardy input image table.
- HO is the Hardy output image table.
- RI is RIO input image table.
- RO is RIO output image table.

The RIO input and output images tables are mapped to physical external devices using RSLogix. DeviceNet and ControlNet input and output image tables are mapped to physical external devices using Rockwell Software’s RS NetWorx. The Hardy input and output image tables have pre-defined meanings for certain bits within the tables.

NOTE: Make sure you use RS NetWorx for DeviceNet and RS NetWorx for ControlNet. They are two different applications.

A Boolean variable is addressed with the syntax below:

[tablename][word offset].[bit offset]

Example:

DI0.3 is bit #3 in the DeviceNet input table, word #0.

Analog Mapping

An analog variable is one that can have many different values. The HI 3030 Weight Controller supports float, 16 bit integer, and 32 bit integer analog variable types.
There are three (3) analog operations supported. The symbols are the same as the Boolean operations, but with different meanings.

- Multiply - The symbol for “Multiply” is “*”.
- Add - The symbol for “Add” is “+”.
- Negate - the symbol for “Negate” is “~”.

Analog tables are given 3 letter names as follows:

DFI, DFO, DSI, DSO, DII, DIO all refer to DeviceNet tables, where the item is a float, a short integer, or a 32 bit integer depending on the first letter in the table name. HFI is a table of Hardy defined floating point numbers.

An analog variable is address with the syntax below:

[tablename][offset]

Example:

- DFO2=HFI0
- Explanation - DeviceNet Float Output Word 2 = Gross Weight

The offset is an offset in words in the case of the DeviceNet tables. The offsets in Hardy tables have various predefined meanings.

- HFI0 - is Gross Weight
- HFI1 - is Net Weight
- . . . . other offsets to be determined.

When an analog equation is evaluated, all terms get converted to float. The final result is then converted to the type of the LHS (Left Hand Side).

Mixed Mapping

It is permissible to have analog variables appear in Boolean equations and to have Boolean variables in analog equations. (We call a mixed equation “Boolean” if its LHS is a Boolean term, and “Analog” if its LHS is an analog term) The interpretation is the following:
A Boolean variable in an analog equation is converted to 1.0 or 0.0.
An Analog variable in a Boolean equation is TRUE if it is greater than zero (0) and FALSE if it is less than or equal zero (0).

Example:

- DO1.0=HF10
- Explanation - DeviceNet Output Word 1, Bit 0 = Gross Weight

Special (Command) Mapping)

Command Interface consists of:

- 16 bit words
- Word 0 Command #
- Word 1 Parameter ID
- Words 2&3 Data.

The commands defined are the following:

WRITEINTEGER, command number 0x1000
The WRITEINTEGER command is used to set the value of integer valued parameters.
Command data:
2 bytes: PARAMETER NUMBER: the number (PARAMID) of the parameter to write.
4 bytes: PARAMETER VALUE: what to set the parameter to.

Data returned by the HI 3030: 8 bytes, echoing the WRITEINTEGER command.

WRITEFLOAT, command number 0x1001
The WRITEFLOAT command is used to set the value of float valued parameters.
Command data:
2 bytes: PARAMETER NUMBER: the number (PARAMID) of the parameter to write.
4 bytes: PARAMETER VALUE: what to set the parameter to.

Data returned by the HI 3030: 8 bytes, echoing the WRITEFLOAT command.

WRITESTRING, command number0x1002
The WRITESTRING command can be used to set the value of any parameter.
Command data:
2 bytes: PARAMETER NUMBER: the number (PARAMID) of the parameter to write.
Variable number of bytes: a zero terminated ASCII string, giving the value to set the parameter to.

Data returned by the HI 3030: 8 bytes, echoing the first 8 bytes of the WRITESTRING command.

READINTEGER 0x2000
READFLOAT 0x2001
These commands are used to read the value of integer or float parameters.
Command data:
2 bytes: PARAMETER NUMBER: the number (PARAMID) of the parameter to read.

Data returned by the HI 3030: 8 bytes. The first 4 bytes echo the command, and the next 4 contain the value of the parameter.

Setting up the command interface in mapping:
Use an equation of the form
CMD0 = (in_table)*(out_table)
In_table is an input table, defining where the command is written.
Out_table defines where the reply data is written.

Example:

CMD0 = DSI0*DOO0

This equation says the command will be written to the DeviceNet input table, at word offset 0, and the reply data is written to the DeviceNet output table, at word offset zero.

It is legal to omit the Out_table.

Example:

CMD0=DSI3

This equation says that the command will be written to the DeviceNet input table, at word offset 3, but no reply data will be written.

Command (CMD) Interface can be used different tables, or multiple locations in one table. Example:

CMD0=DSI0*DSO0+RSI0*RSO0+RSI8*RSO8

Which says a command can show up in DeviceNet input table word 0; Return in DeviceNet Out Table Word 0 or RIO input table word 0; Return in RIO out table word 0 or RIO input table word 8; return RIO out table word 8.

Input and output do not need to start at the same word:

Example: **CMO0=DSI0*DSO4**

Command in DeviceNet input word 0; return DeviceNet out word 4

Command Interface

Parameter Numbers, Code Explanations, Valid Ranges and Default Settings

CAUTION: THESE VALUES AND EXPLANATIONS CAN CHANGE. ALWAYS CHECK ON THE HARDY WEB SITE FOR THE NEWEST COMMAND INTERFACE LIST BEFORE USING THE COMMAND INTERFACE.

NOTE: Data is handled based on the method used writing data to the unit. If data is written using the Command Interface (See Below) the data is interpreted based on the displayed units. However, if data is directly mapped into the unit, the unit assumes lbs (pounds) and converts the entered data to the displayed units.

*NOTE: The default parameter values are marked by **DEF** and bold type.*

Parameter Number (Hexadecimal)	Code Explanation	Valid Range
0001	Operator ID	Max. 3 characters
0002	Instrument ID	Max. 19 characters
0004 = Chan 1 0404 = Chan 2 0804 = Chan 3 0C04 = Chan 4	WAVERSAVER®	0 = None 1 = 7.50 Hz 2 = 3.50 Hz **3 = 1.0 Hz (Def)** 4 = .50 Hz 5 = .25 Hz
0005 = Chan 1 0405 = Chan 2 0805 = Chan 3 0C05 = Chan 4	Number of Averages	1-250 **DEF = 10**
0006 = Chan 1 0406 = Chan 2 0806 = Chan 3 0C06 = Chan 4	Zero Tolerance	0.000001-999999 **DEF = 10**
0007 = Chan 1 0407 = Chan 2 0807 = Chan 3 0C07 = Chan 4	Units of Measure	0 = lb, 1 = Kg, 2 = g 3 = oz **DEF = 0**
0008 = Chan 1 0408 = Chan 2 0808 = Chan3 0C08 = Chan 4	Decimal Point	0-5 **DEF = 2**
000A = Chan 1 040A = Chan 2 080A = Chan 3 0C0A = Chan 4	Grad Size	**0=1 (DEF)**, 1=2, 2=5, 3=10, 4=20, 5=50, 6=100, 7=200, 8=500, 9=1000
000D = Chan 1 040D = Chan 2 080D = Chan 3 0C0D = Chan 4	Motion Tolerance	0.000001-999999 **DEF=10.00**
000E = Chan 1 040E = Chan 2 080E = Chan 3 0C0E = Chan 4	Auto-Zero Tolerance	0.000001-999999 **DEF=10.00**
000F = Chan 1 040F = Chan 2 080F = Chan 3 0C0F = Chan 4	Capacity	0.000001-999999 **DEF=999999.0**
0010	Infrared Enable	**1 = ON (DEF)**, 0 = OFF
002A	Printer Baud Rate	0 = 300 1 = 1200 2 = 2400 3 = 4800 **4 = 9600 (DEF)** 5 = 19200

TABLE 6-2: PARAMETER NUMBER, CODE EXPLANATION, VALID RANGES AND DEFAULTS

Parameter Number (Hexadecimal)	Code Explanation	Valid Range
002B	Printer Parity	**0 = None (DEF)** 1 = Odd 2 = Even
002C	Printer Data Bits	0 = 7 bits **1 = 8 bits (DEF)**
002D	Setpoint Menu Security (Write Only)	**0 (DEF)**
002E	Setup Menu Security (Write Only)	**0 (DEF)**
002F	Calibration Menu Security	**0 (DEF)**
0030	Options Menu Security	**0 (DEF)**
0031	Mapping Menu Security	**0 (DEF)**
0033	Local Clear Security	**0 (DEF)**
0034	Medium Level Password	**0 (DEF)**
0035	High Level Password	**0 (DEF)**
0036	DeviceNet Baud Rate	**0 = 125kbps (DEF)** 1 = 250kbps 2 = 500kbps
0037	DeviceNet Node Address	0-63 **DEF=0**
003F	RIO Baud Rate	**0 = 57kbps (DEF)** 1 = 115kbps 2 = 230kbps
0040	RIO Rack Address	0-59 **DEF=2**
0041	RIO Rack Size	**0 = 1/4 (DEF)** 1 = 1/2 2 = 3/4 3 = 4/4
0042	RIO Quarter #	**0 = 1st (DEF)** 1 = 2nd 2 = 3rd 3 = 4th
0043	RIO Last Quarter	1 = YES **0 = NO (DEF)**
0044	ControlNet Address	1-99 **DEF=1**
0045	Main Active	1=ON 0=OFF
0046	Mail Server	**“mailserver” (DEF)**

TABLE 6-2: PARAMETER NUMBER, CODE EXPLANATION, VALID RANGES AND DEFAULTS

Parameter Number (Hexadecimal)	Code Explanation	Valid Range
0047	Mail User ID	**“user” (DEF)**
0048	Mail From Address	**“HI3000” (DEF)**
0049	Mail To Address	**{** **{“”, 0},** **{“”, 0},** **{“”, 0}** **}** **(DEF)**
004B	Mail To Config	
004C	Channel Name	Max. 19 characters **DEF=Channel 1**
044C	Channel Name	Max. 19 characters **DEF=Channel 2**
084C	Channel Name	Max. 19 characters **DEF=Channel 3**
0C4C	Channel Name	Max. 19 characters **DEF=Channel 4**
0105 (Write Only)	Parameter Instance	
0200 = Chan 1	Reference Weight Cal LO or C2	0.000001-999999 **DEF=0**
0600 = Chan 2	Reference Weight Cal LO or C2	0.000001-999999 **DEF=0**
0A00 = Chan 3	Reference Weight Cal LO or C2	0.000001-999999 **DEF=0**
0E00 = Chan 4	Reference Weight Cal LO or C2	0.000001-999999 **DEF=0**
0201 = Chan 1	Span Weight	0.000001-999999 DEF=1000.0000
02F0 (Write Only)	Parameter Map	
02F2	Mapped Float	
0601 = Chan 2	Span Weight	0.000001-999999 **DEF=1000.0000**
0A01 = Chan 3	Span Weight	0.000001-999999 **DEF=1000.0000**
0E01 = Chan 4	Span Weight	0.000001-999999 **DEF=1000.0000**
0204 = Chan 1 (Read Only)	Cal Type	**Not Cal’d (DEF)** 1 = C2 0 = Traditional Hard Calibration

TABLE 6-2: PARAMETER NUMBER, CODE EXPLANATION, VALID RANGES AND DEFAULTS

Parameter Number (Hexadecimal)	Code Explanation	Valid Range
0604 = Chan 2 (Read Only)	Cal Type	**Not Cal'd (DEF)** 1 = C2 0 = Traditional Hard Calibration
0A04 = Chan 3 (Read Only)	Cal Type	**Not Cal'd (DEF)** 1 = C2 0 = Traditional Hard Calibration
0E04 = Chan 4 (Read Only)	Cal Type	**Not Cal'd (DEF)** 1 = C2 0 = Traditional Hard Calibration
0280 (Read Only)	Serial Number	53
0281 (Read Only)	Model Number	**HI 3030 (DEF)**
0282 (Read Only)	Program Part Number	0650-0xxx-01
0283 (Read Only)	Firmware Revision	X.X.XX
0320 = Setpt 1 0720 = Setpt 2 0B20 = Setpt 3 0F20 = Setpt 4 1320 = Setpt 5 1720 = Setpt 6 1B20 = Setpt 7 1F20 = Setpt 8 2320 = Setpt 9 2720 = Setpt 10 2B20 = Setpt 11 2F20 = Setpt 12	Setpoint Amount Req'd	.000001 - 999999 Positive or Negative values **DEF=0.000000**
0321 = Setpt 1 0721 = Setpt 2 0B21 = Setpt 3 0F21 = Setpt 4 1321 = Setpt 5 1721 = Setpt 6 1B21 = Setpt 7 1F21 = Setpt 8 2321 = Setpt 9 2721 = Setpt 10 2B21 = Setpt 11 2F21 = Setpt 12	Preact	.000001 - 999999 Positive or Negative values **DEF=1.000000**

TABLE 6-2: PARAMETER NUMBER, CODE EXPLANATION, VALID RANGES AND DEFAULTS

Parameter Number (Hexadecimal)	Code Explanation	Valid Range
0322 = Setpt 1 0722 = Setpt 2 0B22 = Setpt 3 0F22 = Setpt 4 1322 = Setpt 5 1722 = Setpt 6 1B22 = Setpt 7 1F22 = Setpt 8 2322 = Setpt 9 2722 = Setpt 10 2B22 = Setpt 11 2F22 = Setpt 12	Deadband	.000001 - 999999 Positive or Negative values **DEF=1.000000**

TABLE 6-2: PARAMETER NUMBER, CODE EXPLANATION, VALID RANGES AND DEFAULTS

Getting the Parameter Information on the Web Browser

Step 1. From the Weight Controller Home Page, click Operation to display tThe Operation Page (See Fig. 6-38).

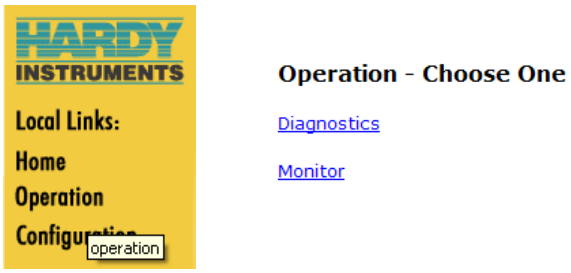


FIG. 6-38 WEIGHT CONTROLLER HOME PAGE/ SELECTING OPERATION

FIG. 6-39 OPERATION PAGE / SELECTING DIAGNOSTICS

Step 2. Click on Diagnostics. (See Fig. 6-38) The Diagnostics Page appears. (See Fig. 6-39)

Step 3. Click on Parameters to display a complete list of the Parameters with settings. (See Fig. 6-40)

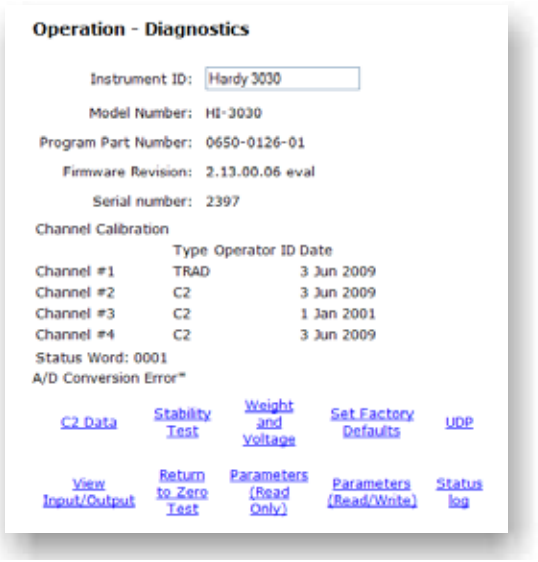


FIG. 6-40 DIAGNOSTICS PAGE/SELECTING PARAMETERS

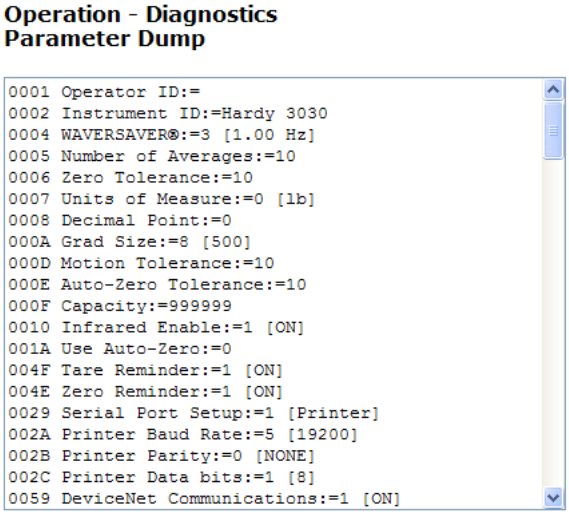


FIG. 6-41 LIST OF PARAMETER SETTINGS

Step 4. To print a hard copy, click on the printer icon in your browser or highlight all the parameters and cut and paste to your word processor, then print and save the list.

Mapping from the Front Panel

NOTE: Mapping from the Front Panel is for the instrument only. To do network mapping you will need to go to the Mapping Setup page on the HI 3030 web site.

Step 1. Press the Setup/3/DEF button once. The Configuration Menu appears with the cursor in front of "ADJUST SETPOINTS" (Default).

Step 2. Press the down or up arrow buttons to move the cursor in front of I/O Mapping. (See Fig. 6-41)

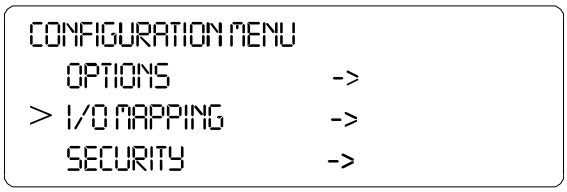


FIG. 6-42 CONFIGURATION MENU/I/O MAPPING

Step 3. Press the Enter button. The Basic I/O Mapping Menu appears. (See Fig. 6-43) The List you see is a list of Destinations. You need to map the Source to the Destination (Tare Scale 2)

Step 4. Press the down arrow button until the cursor is in front of "Tare Scale 2" appears. (See Fig. 6-42)

Step 5. Press the Enter button to map the Source.

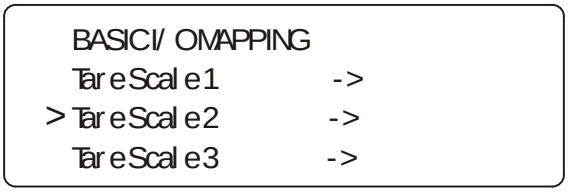


FIG. 6-43 BASIC I/O MAPPING/TARE SCALE 2

Step 6. You see that the “Tare Scale 2” is Not Mapped. (See Fig. 6-43)

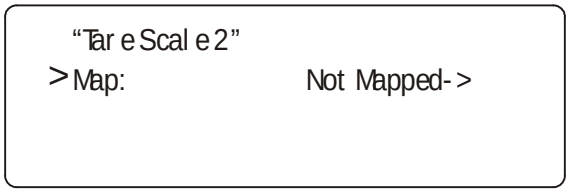


FIG. 6-44 TARE SCALE 2/NOT MAPPED

Step 7. Press the Enter button. (See Fig. 6-44) The ITEM SELECTION Menu appears. (See Fig. 6-44)

FIG. 6-45 ITEM SELECTION MENU

Step 8. Press the down arrow button to move the cursor in front of the Item you want to map to Tare Scale 2. In our example we want to map Input 1 to Tare Scale 2.

Step 9. Press the up or down arrow buttons to select the Input you want to map to. In our example we want to map Input 1 to Tare Scale 2. We move the cursor in front of Input 1. (See Fig. 6-45)

Step 10. Press the Enter button to set the entry.

Step 11. Press the Exit button to return to the Tare Scale 2 menu. You see Input 1 has replaced Not Mapped. (See Fig. 6-46)

FIG. 6-46 ITEM SELECTION/INPUT 1

FIG. 6-47 TARE SCALE 2/SOURCE MAPPED

Step 12. Press Exit to get back to the Basic I/O Mapping Menu. Notice that an asterisk has been added to the right arrow indicating that Tare Scale 2 is mapped to something. (See Fig. 6-47)

Step 13. To Map other items repeat steps 1-13 for those items you want to map.

FIG. 6-48 TARE SCALE 2 MAP INDICATION

Step 14. To check what Items are mapped to which Input or What Outputs are mapped to which Item, just go to the Basic I/O Mapping Menu, select the Destination you want to see and press Enter. The mapped data is readily available.

Unmapping Procedures

Step 1. To Unmap Items go to the Basic I/O Mapping Menu.
Step 2. Press the up or down arrow buttons until the cursor is in front of the Item you want to unmap. In our example we used Tare Scale 2.
Step 3. Press the Enter button. The Item “Tare Scale 2” Menu appears. (See fig. 6-48)
Step 4. Press the down arrow until the cursor is in front of Item.
Step 5. Press the Enter button.

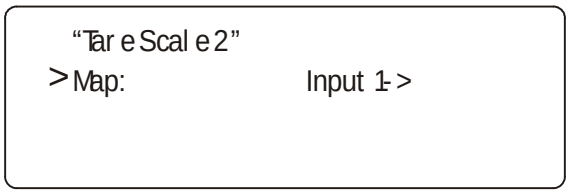


FIG. 6-49 TARE SCALE 2/INPUT 1

Step 6. Press the up or down arrow buttons until the cursor is in front of Not Mapped. (See Fig. 6-49)

FIG. 6-50 ITEM SELECTION/SELECTING NOT MAPPED

Step 7. Press the enter button to set the entry.
Step 8. Press the Exit button to return to the Tare Scale 2 Menu. (See Fig. 6-50)

FIG. 6-51 OK TO FILL MENU/ITEM UNMAPPED

Step 9. Press on the Exit button to return to the Basic I/O Mapping Menu appears. (See fig. 6-51) Notice that the asterisk no longer appears. This tells you that the item is unmapped. To unmap more items, repeat steps 1-8

FIG. 6-52 BASIC I/O MAPPING/TARE SCALE 2 UNMAPPED

Mapping a Hardy Control-Link Network to a ControlNet/DeviceNet/Profibus Network

FIG. 6-53 HARDY CONTROL-LINK NETWORK CONNECTED TO A CONTROLNET/DEVICENET/ PROFIBUS NETWORK

The Hardy HI 3000 Series of controllers are designed to save you money. To connect a Hardy Control-Link Network to a ControlNet/DeviceNet/Profibus Network simply purchase one of the Hardy HI 3000 Series Network Interface Option Cards and install it in the instrument that you want to directly connect to the other network. You can map to this instrument from all the other instruments on the Hardy Control-Link Network, rather than buy a separate network card for each instrument. (See Fig. 6-53)

Step 1. Determine into which Instrument you want to install the Network option card.
Step 2. Install the network card. See the HI 3000 Installation and Operation manual, Cabling and Installation Section.
Step 3. Connect the network cables from the designated HI 3000 Series Instrument and begin mapping to that instrument from either the Hardy Control-Link Network or the ControlNet/DeviceNet/Profibus Network.

CHAPTER 7: TROUBLESHOOTING

About Chapter 7

Chapter 7 consists of all the procedures for troubleshooting the electrical, mechanical and firmware elements of the HI 3030 Weight Controller in the event of a malfunction. Included in Chapter 7 is a comprehensive flow chart to provide a road map for troubleshooting an entire Weight Controller system, including load cells and cabling.

Disassembly and Reassembly Notes and Cautions

- Always disconnect the power cord before disassembling.

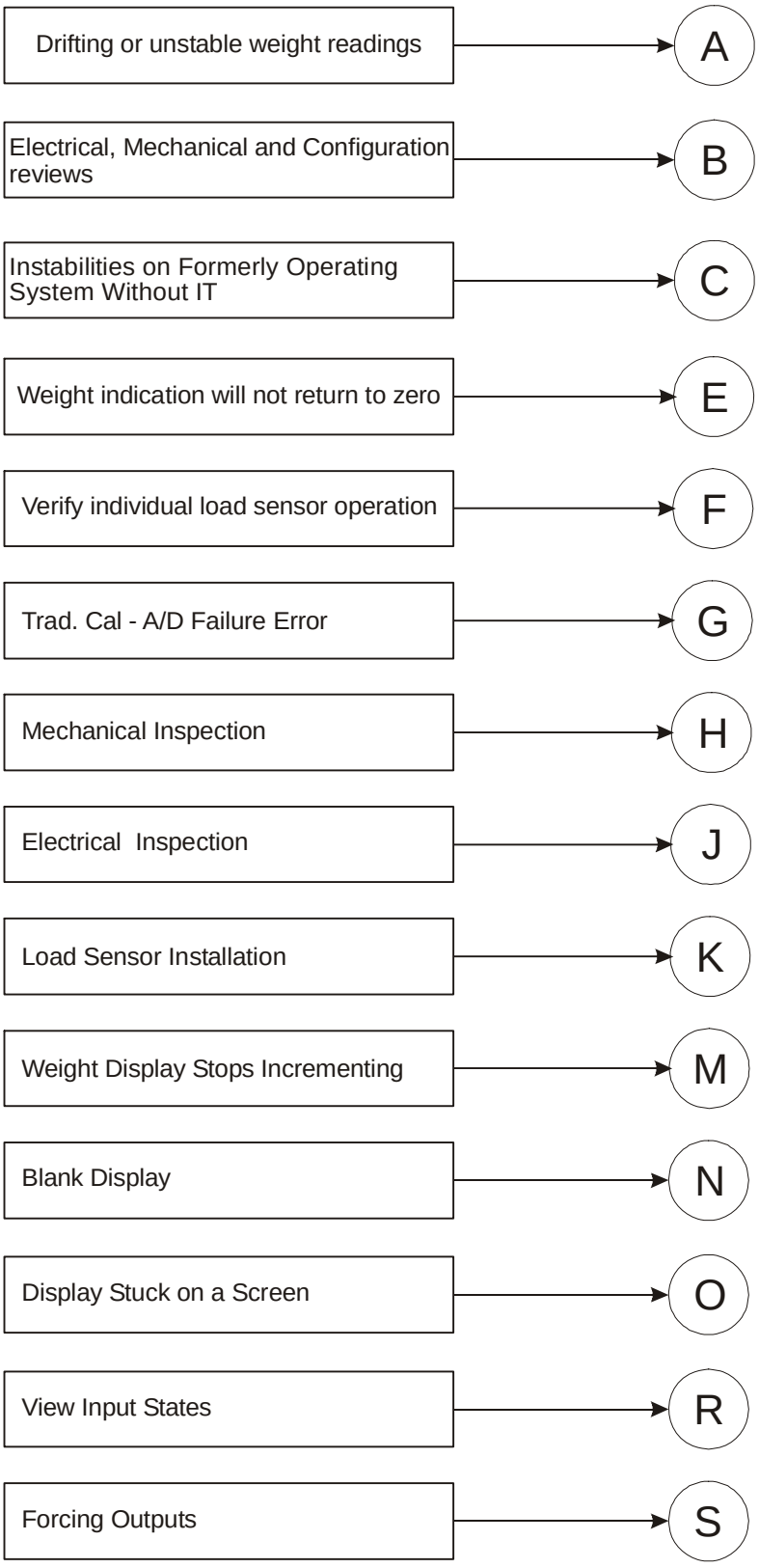
WARNING: FAILURE TO DISCONNECT THE POWER CORD BEFORE DISASSEMBLING MAY CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

- Make sure that any disassembly is done in a clean, well ventilated, properly controlled static environment.
- Always make sure that the assemblies and sub-assemblies are well supported and insulated when doing any repairs on the Weight Controller.
- Place small fasteners, connectors and electrical parts in closed containers so as not to lose parts during reassembly.
- Read all the disassembly instructions before any disassembly begins. Be sure that you are familiar with the procedures. If any of the instructions for disassembly are unclear, contact Hardy Instruments, Technical Support Department for additional information and assistance.
- Do not disconnect any electrical plug, connector or terminal unless an identification tag is present or one is attached. Always note where the connector or plug was attached to the electrical component or wiring harness.
- Always install complete hardware groups (Screws, Washers, Lock Washers, Spacers, Etc.) back to the original point of removal.
- Always replace broken or damaged modules or hardware immediately!
- Always check to be sure that no loose parts are sitting on printed circuit boards or electrical connectors or wires when disassembling or reassembling.
- Always protect printed circuit boards from electrostatic discharge (ESD). Always use approved ESD wrist straps and anti-static pads.
- Always perform a final inspection after completing any reassembly to be sure that all fasteners are tight, all connectors are secure and there are no loose parts on any of the printed circuit boards in the Weight Controller.
- Always follow proper safety procedures when working on or around the Weight Controller.

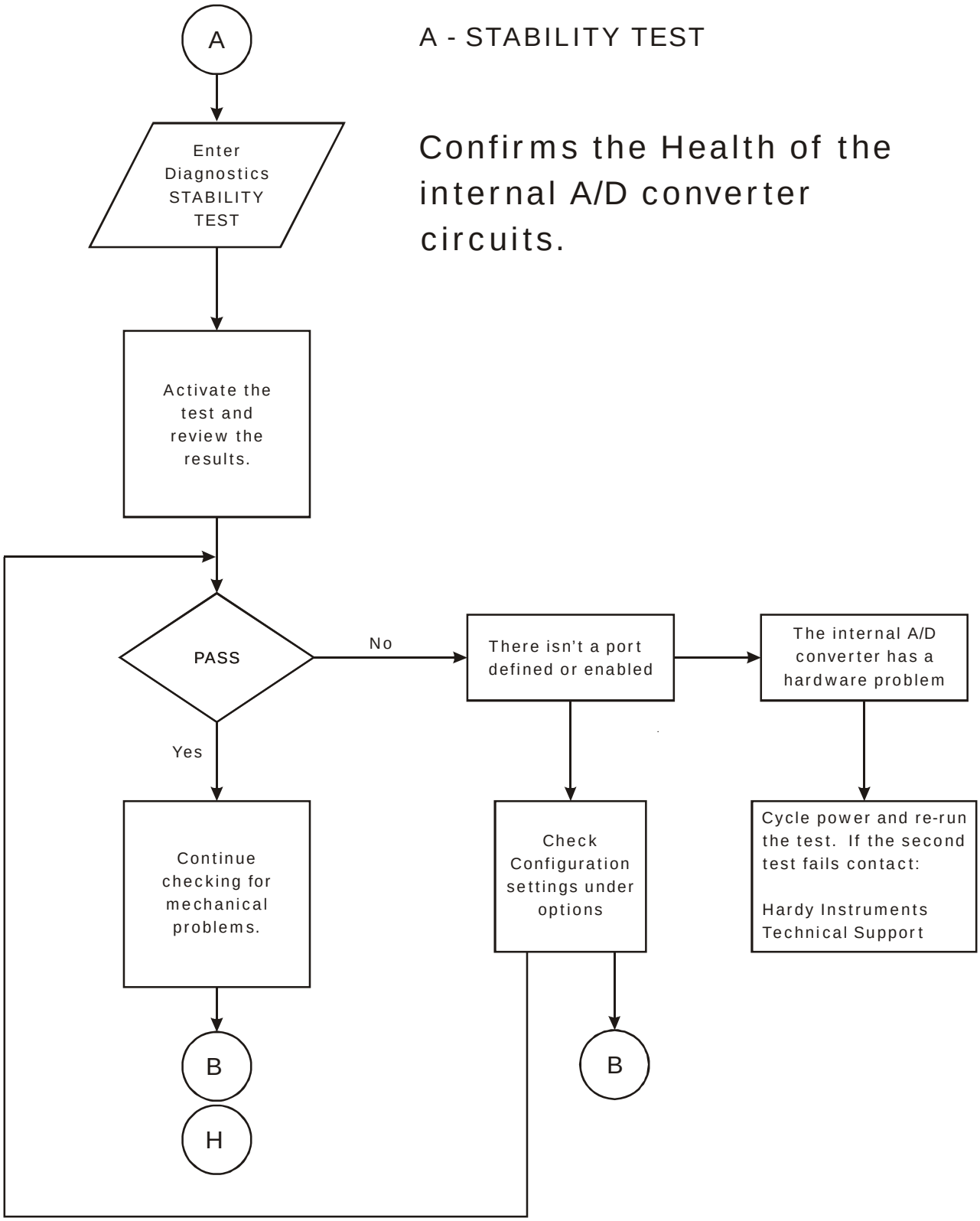
Error Messages

!A/D Failure Error! - Internal Electronics Error, Retry.
!A/D Convert Error! - Load Cells input out of range.
!Motion Error! - Check Settings and Retry
!Trad Cal Error! - Error occurred during calibration, re-calibrate.
!C2 Cal Error! - Error occurred during calibration, re-calibrate.
!Too Lo Error! - Verify that the load cell signal level is0-15 mV. Verify that there is enough weight on the scale. Perform Span than go back and Zero.
!Too Hi Error! - Verify that the load cell signal level is 0-15mV. Verify that there is enough weight on the scale. Perform Span than go back and Zero.
!No C2 Sensor! - Instrument did not detect a C2 Load Sensor
!CAL Failed! - Too few counts between Zero and Span.
!C2 Caps Unequal! - Different load cell capacities (For example 50 lbs capacity load cell and 100 lbs capacity load cell on one system. Make the load cells even be removing the uneven load cell and replacing it with a load cell that is equal to the others capacity.
!HI/LO Too Close! - Zero and Span are not more than 1,000 counts from each other or there is no change or negative change. Reset either so the counts are more than 1,000 counts of each other.
!Function Error! - Pressed a function button and the Function did not work. Try again. Cycle power.
!Not Allowed! - Value entered is outside the range allowed. Try another value.
!Security Violation! - User signed in with a password that does not allow performance of a certain function or entry to certain menus. Security level of the user identified in the User ID, too low for the menu or function.

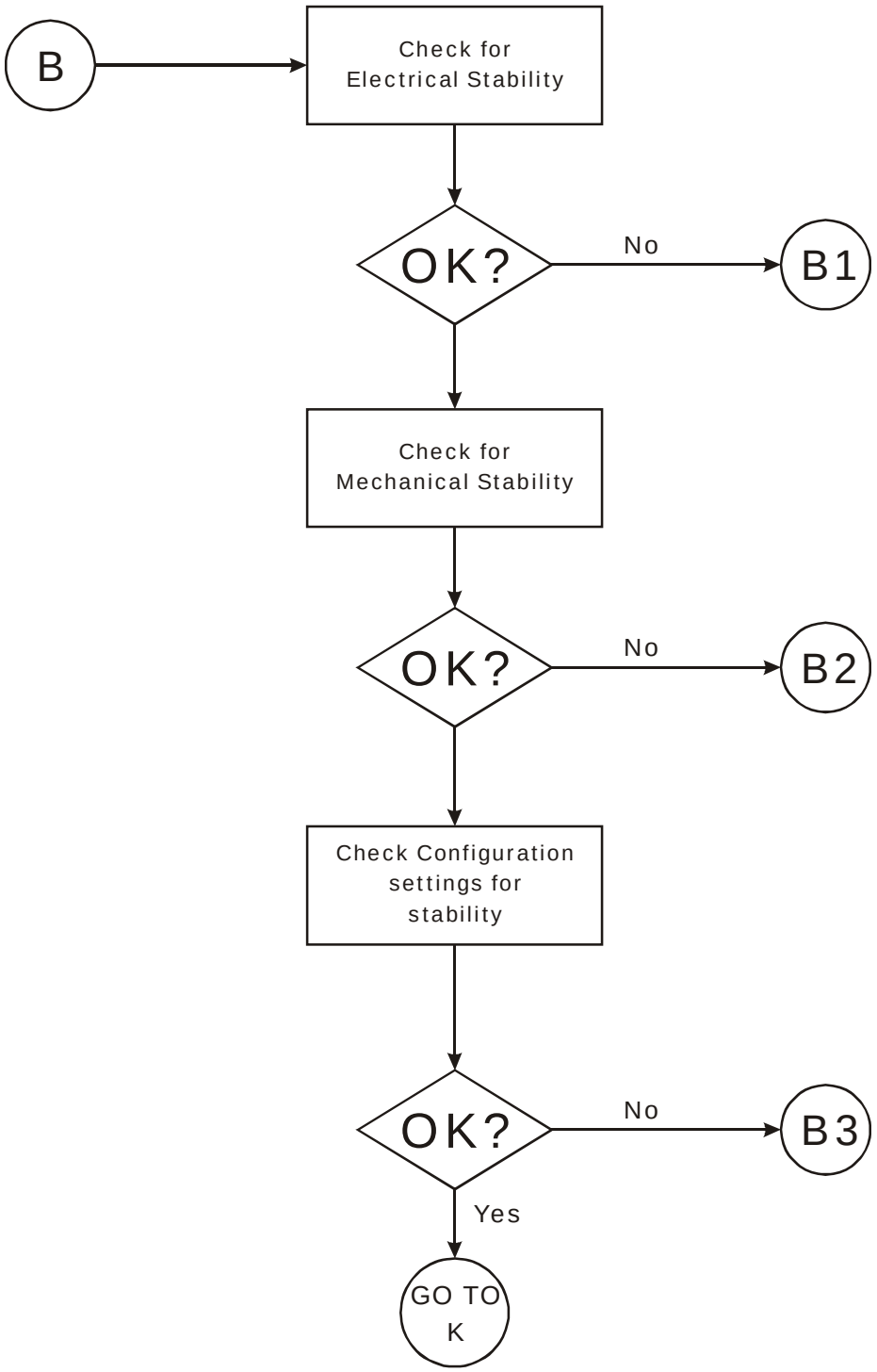
General Troubleshooting Flow Chart Index



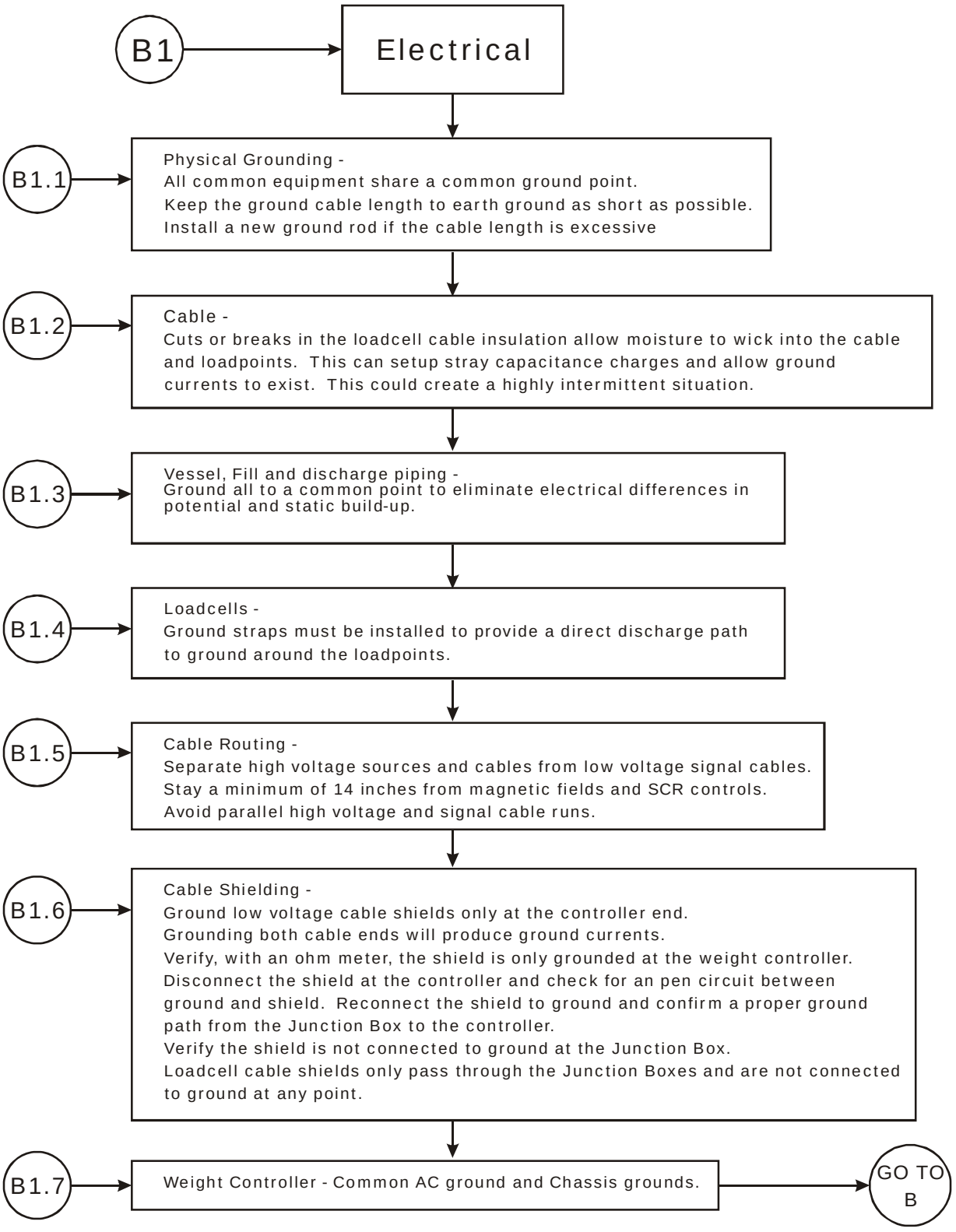
A - Stability Test


A
A - STABILITY TEST
Confirms the Health of the internal A/D converter circuits.
Enter Diagnostics STABILITY TEST
Activate the test and review the results.
PASS
No
There isn't a port defined or enabled
The internal A/D converter has a hardware problem
Yes
Continue checking for mechanical problems.
Check Configuration settings under options
Cycle power and re-run the test. If the second test fails contact:
Hardy Instruments Technical Support
B
H
B

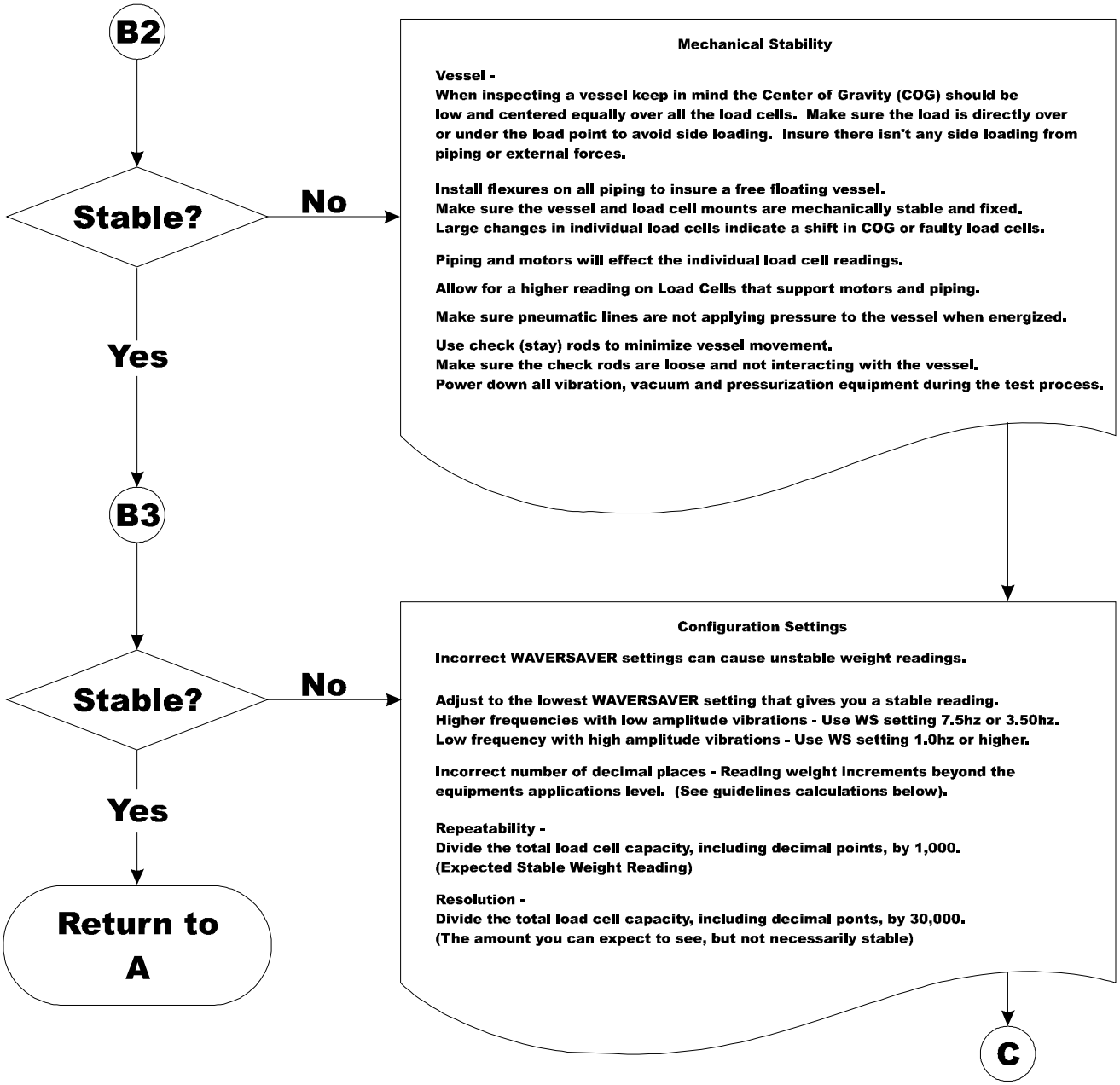
B - Guidelines for Instabilities on Formerly Operating Systems



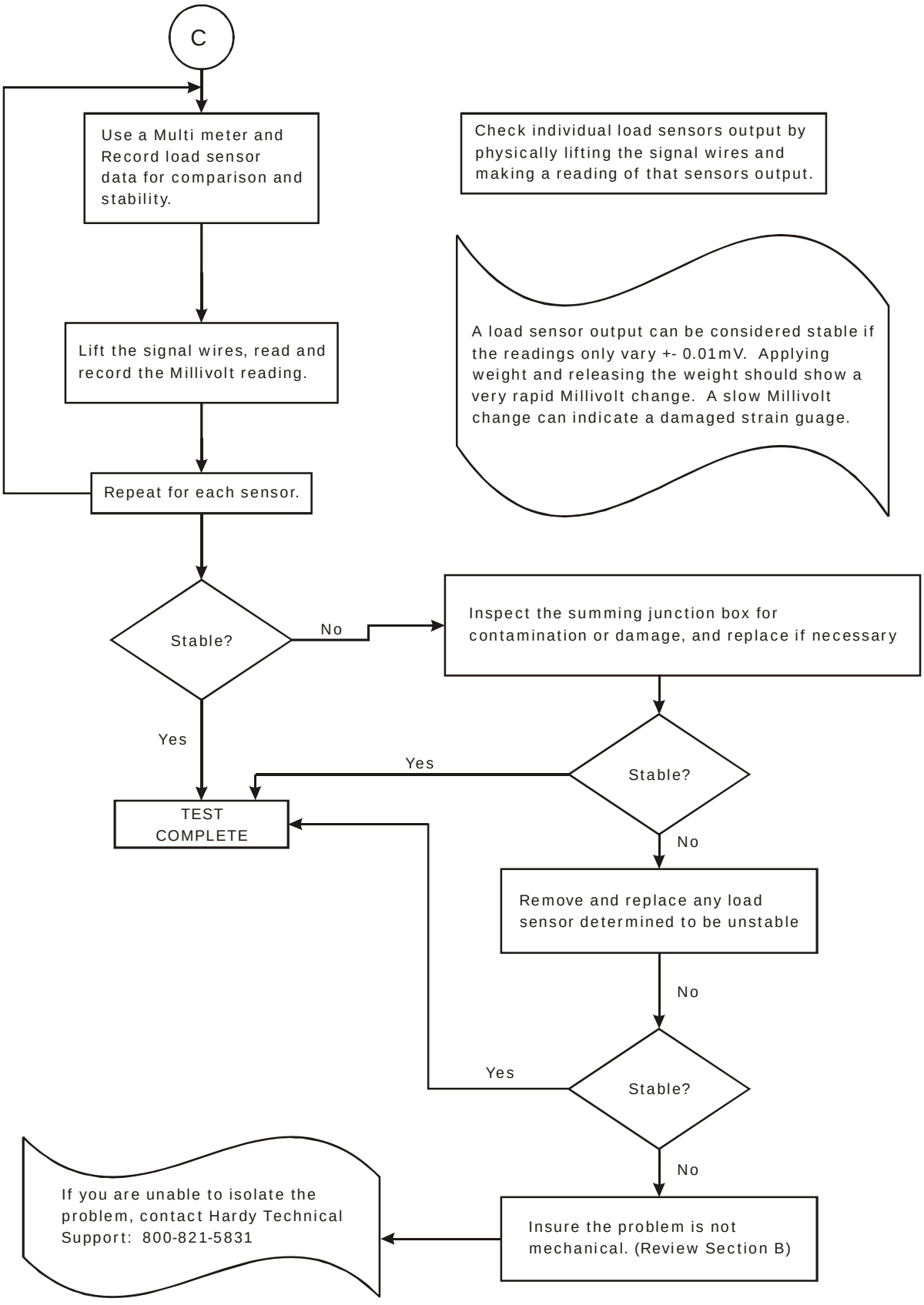
B1 - Guidelines for Instabilities on Formerly Operating Systems (Cont'd)


B1
Electrical
B1.1
Physical Grounding -
All common equipment share a common ground point.
Keep the ground cable length to earth ground as short as possible.
Install a new ground rod if the cable length is excessive
B1.2
Cable -
Cuts or breaks in the loadcell cable insulation allow moisture to wick into the cable and loadpoints. This can setup stray capacitance charges and allow ground currents to exist. This could create a highly intermittent situation.
B1.3
Vessel, Fill and discharge piping -
Ground all to a common point to eliminate electrical differences in potential and static build-up.
B1.4
Loadcells -
Ground straps must be installed to provide a direct discharge path to ground around the loadpoints.
B1.5
Cable Routing -
Separate high voltage sources and cables from low voltage signal cables.
Stay a minimum of 14 inches from magnetic fields and SCR controls.
Avoid parallel high voltage and signal cable runs.
B1.6
Cable Shielding -
Ground low voltage cable shields only at the controller end.
Grounding both cable ends will produce ground currents.
Verify, with an ohm meter, the shield is only grounded at the weight controller.
Disconnect the shield at the controller and check for an pen circuit between ground and shield. Reconnect the shield to ground and confirm a proper ground path from the Junction Box to the controller.
Verify the shield is not connected to ground at the Junction Box.
Loadcell cable shields only pass through the Junction Boxes and are not connected to ground at any point.
B1.7
Weight Controller - Common AC ground and Chassis grounds.
GO TO B

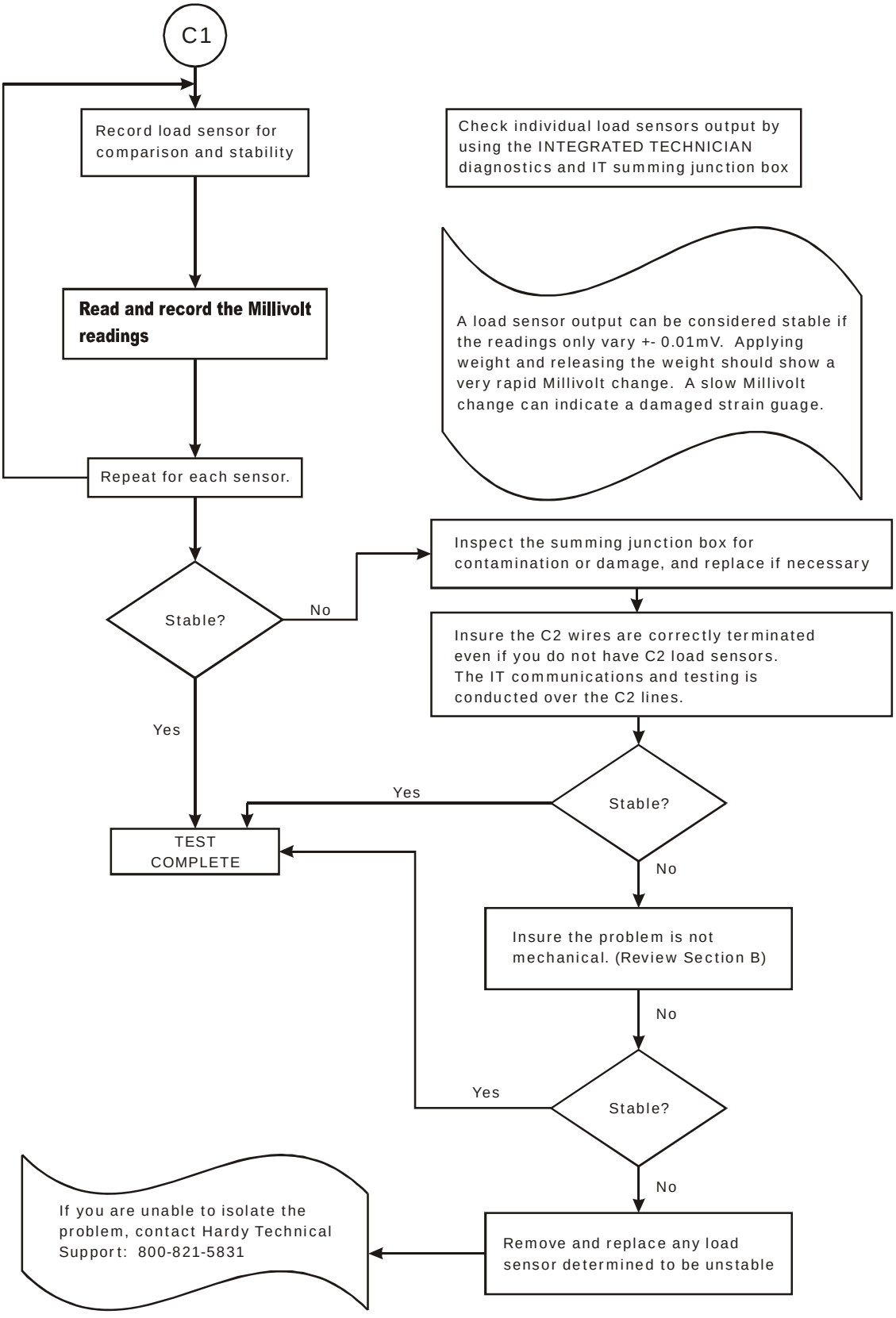
B2 - Guidelines for Instabilities on Formerly Operating Systems: Mechanical Stability and Configuration Settings


B2
Stable?
No
Yes
B3
Stable?
No
Yes
Return to A
Mechanical Stability
Vessel -
When inspecting a vessel keep in mind the Center of Gravity (COG) should be low and centered equally over all the load cells. Make sure the load is directly over or under the load point to avoid side loading. Insure there isn't any side loading from piping or external forces.
Install flexures on all piping to insure a free floating vessel.
Make sure the vessel and load cell mounts are mechanically stable and fixed.
Large changes in individual load cells indicate a shift in COG or faulty load cells.
Piping and motors will effect the individual load cell readings.
Allow for a higher reading on Load Cells that support motors and piping.
Make sure pneumatic lines are not applying pressure to the vessel when energized.
Use check (stay) rods to minimize vessel movement.
Make sure the check rods are loose and not interacting with the vessel.
Power down all vibration, vacuum and pressurization equipment during the test process.
Configuration Settings
Incorrect WAVERSAVER settings can cause unstable weight readings.
Adjust to the lowest WAVERSAVER setting that gives you a stable reading.
Higher frequencies with low amplitude vibrations - Use WS setting 7.5hz or 3.50hz.
Low frequency with high amplitude vibrations - Use WS setting 1.0hz or higher.
Incorrect number of decimal places - Reading weight increments beyond the equipments applications level. (See guidelines calculations below).
Repeatability -
Divide the total load cell capacity, including decimal points, by 1,000.
(Expected Stable Weight Reading)
Resolution -
Divide the total load cell capacity, including decimal ponts, by 30,000.
(The amount you can expect to see, but not necessarily stable)
C

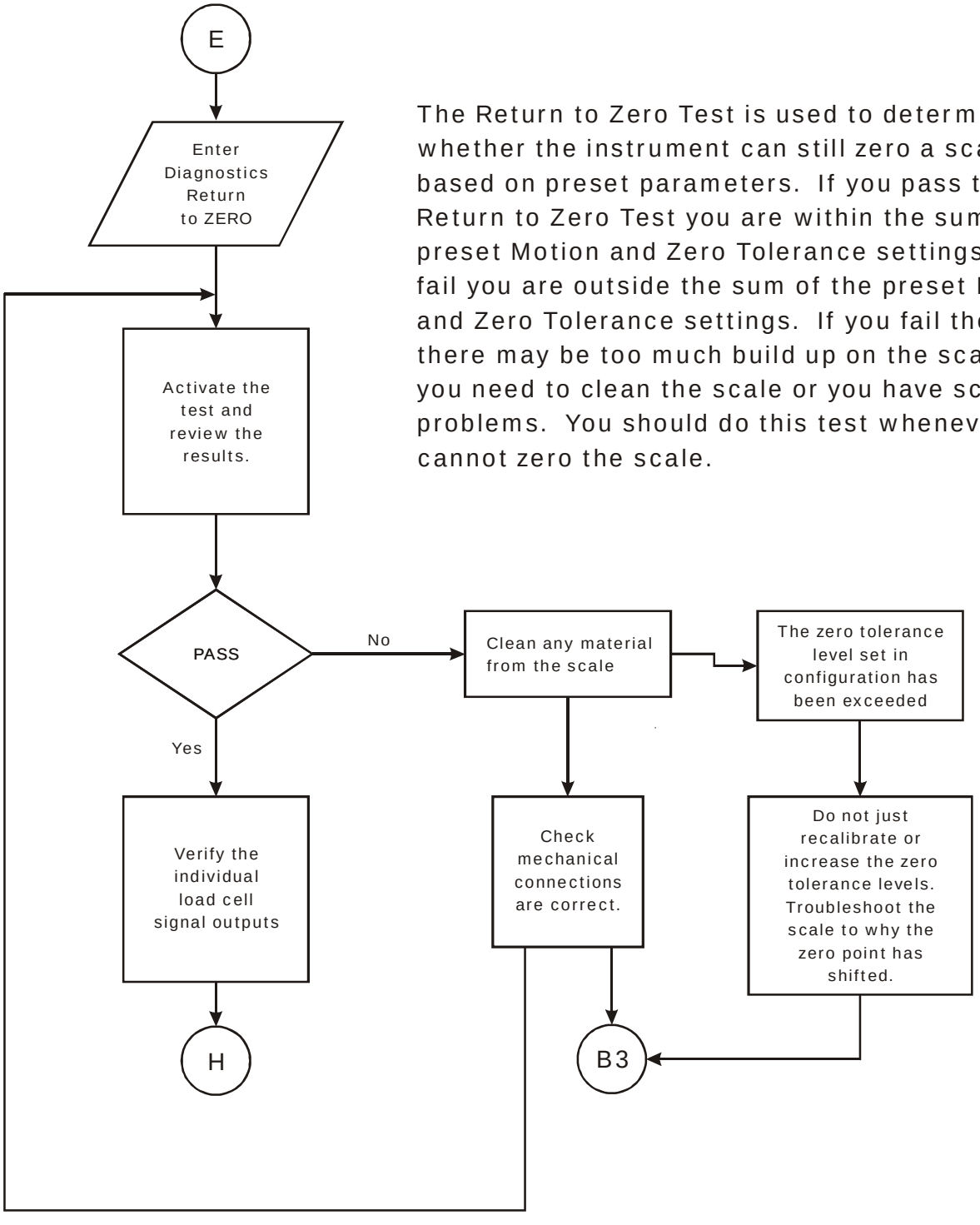
C - Guidelines for Instabilities on Formerly Operating Systems


C
Use a Multi meter and Record load sensor data for comparison and stability.
Check individual load sensors output by physically lifting the signal wires and making a reading of that sensors output.
Lift the signal wires, read and record the Millivolt reading.
A load sensor output can be considered stable if the readings only vary +- 0.01mV. Applying weight and releasing the weight should show a very rapid Millivolt change. A slow Millivolt change can indicate a damaged strain guage.
Repeat for each sensor.
Stable?
No
Inspect the summing junction box for contamination or damage, and replace if necessary
Yes
Stable?
Yes
TEST COMPLETE
No
Remove and replace any load sensor determined to be unstable
No
Yes
Stable?
No
If you are unable to isolate the problem, contact Hardy Technical Support: 800-821-5831
Insure the problem is not mechanical. (Review Section B)

C1 - Guidelines for Instabilities on formerly Operating systems with the Integrated Technician Summing Junction Box diagnostics

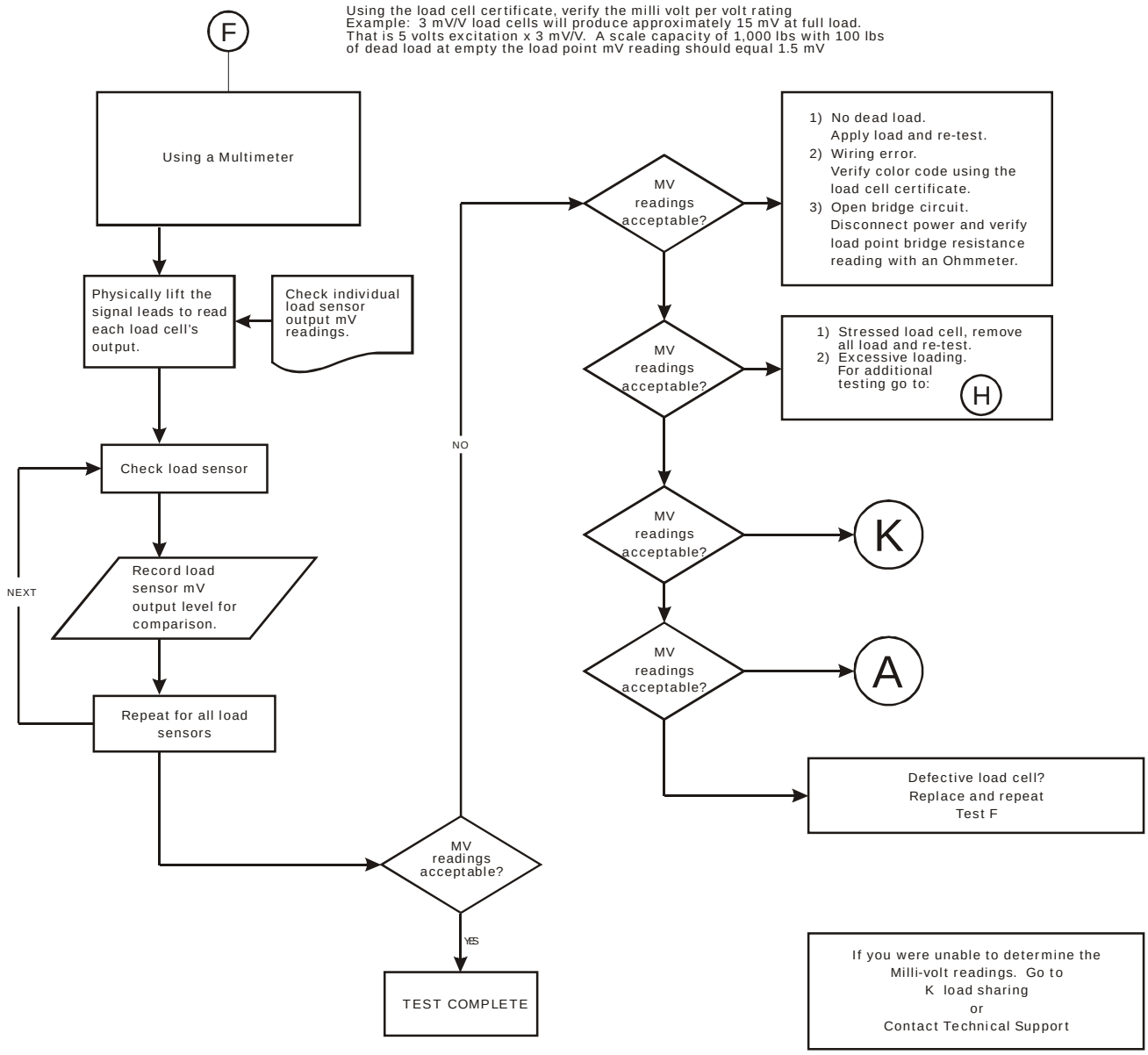

C1
Record load sensor for comparison and stability
Read and record the Millivolt readings
Repeat for each sensor.
Stable?
No
Yes
Check individual load sensors output by using the INTEGRATED TECHNICIAN diagnostics and IT summing junction box
A load sensor output can be considered stable if the readings only vary +- 0.01mV. Applying weight and releasing the weight should show a very rapid Millivolt change. A slow Millivolt change can indicate a damaged strain guage.
Inspect the summing junction box for contamination or damage, and replace if necessary
Insure the C2 wires are correctly terminated even if you do not have C2 load sensors. The IT communications and testing is conducted over the C2 lines.
Stable?
Yes
No
TEST COMPLETE
Insure the problem is not mechanical. (Review Section B)
Stable?
Yes
No
Remove and replace any load sensor determined to be unstable
If you are unable to isolate the problem, contact Hardy Technical Support: 800-821-5831

E - Return to Zero Test

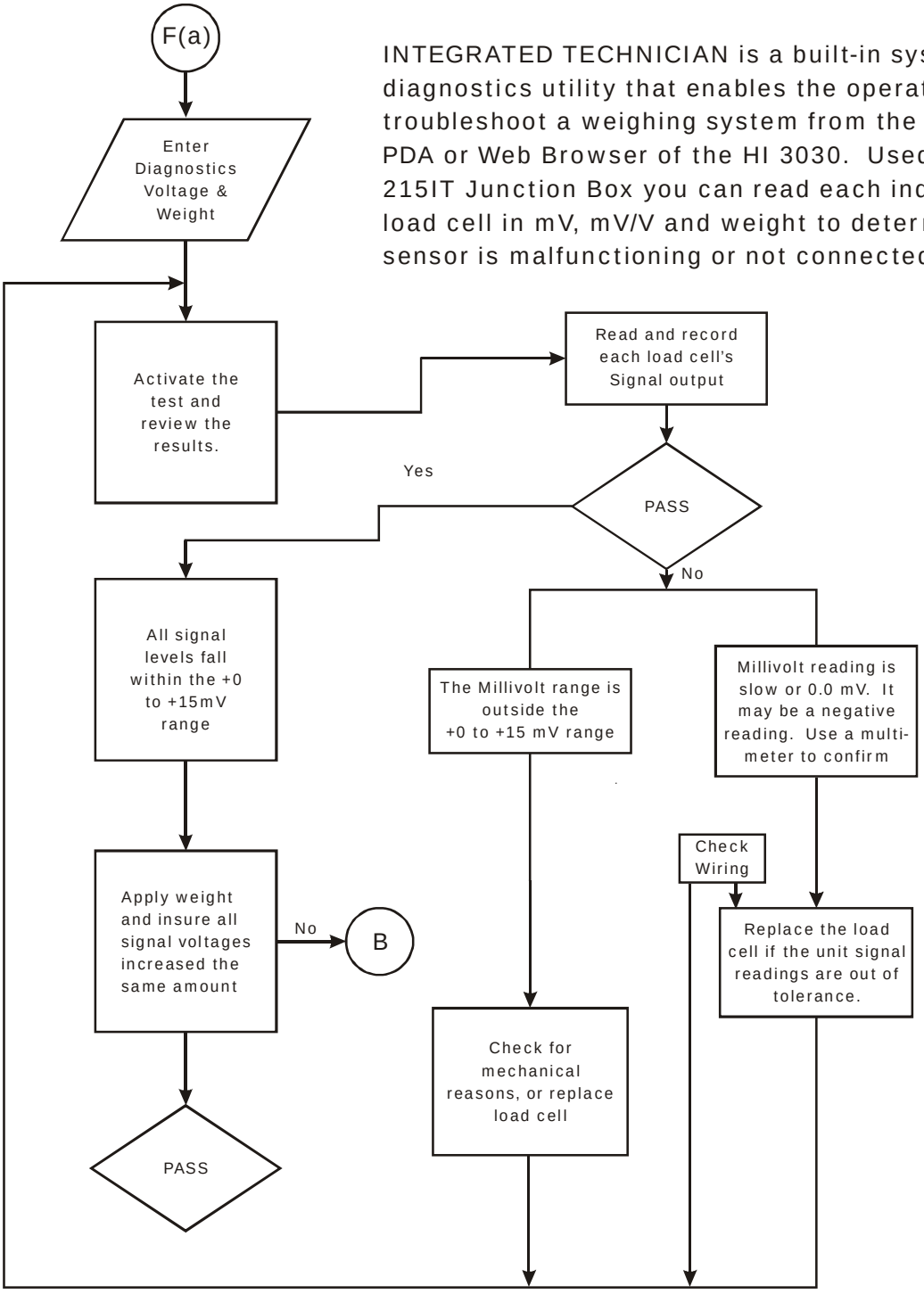

E
Enter Diagnostics Return to ZERO
Activate the test and review the results.
PASS
No
Clean any material from the scale
The zero tolerance level set in configuration has been exceeded
Yes
Verify the individual load cell signal outputs
Check mechanical connections are correct.
Do not just recalibrate or increase the zero tolerance levels. Troubleshoot the scale to why the zero point has shifted.
H
B3

The Return to Zero Test is used to determine whether the instrument can still zero a scale based on preset parameters. If you pass the Return to Zero Test you are within the sum of the preset Motion and Zero Tolerance settings. If you fail you are outside the sum of the preset Motion and Zero Tolerance settings. If you fail the test there may be too much build up on the scale and you need to clean the scale or you have scale problems. You should do this test whenever you cannot zero the scale.

F - Verify Individual Load Cell Milli-Volt Readings

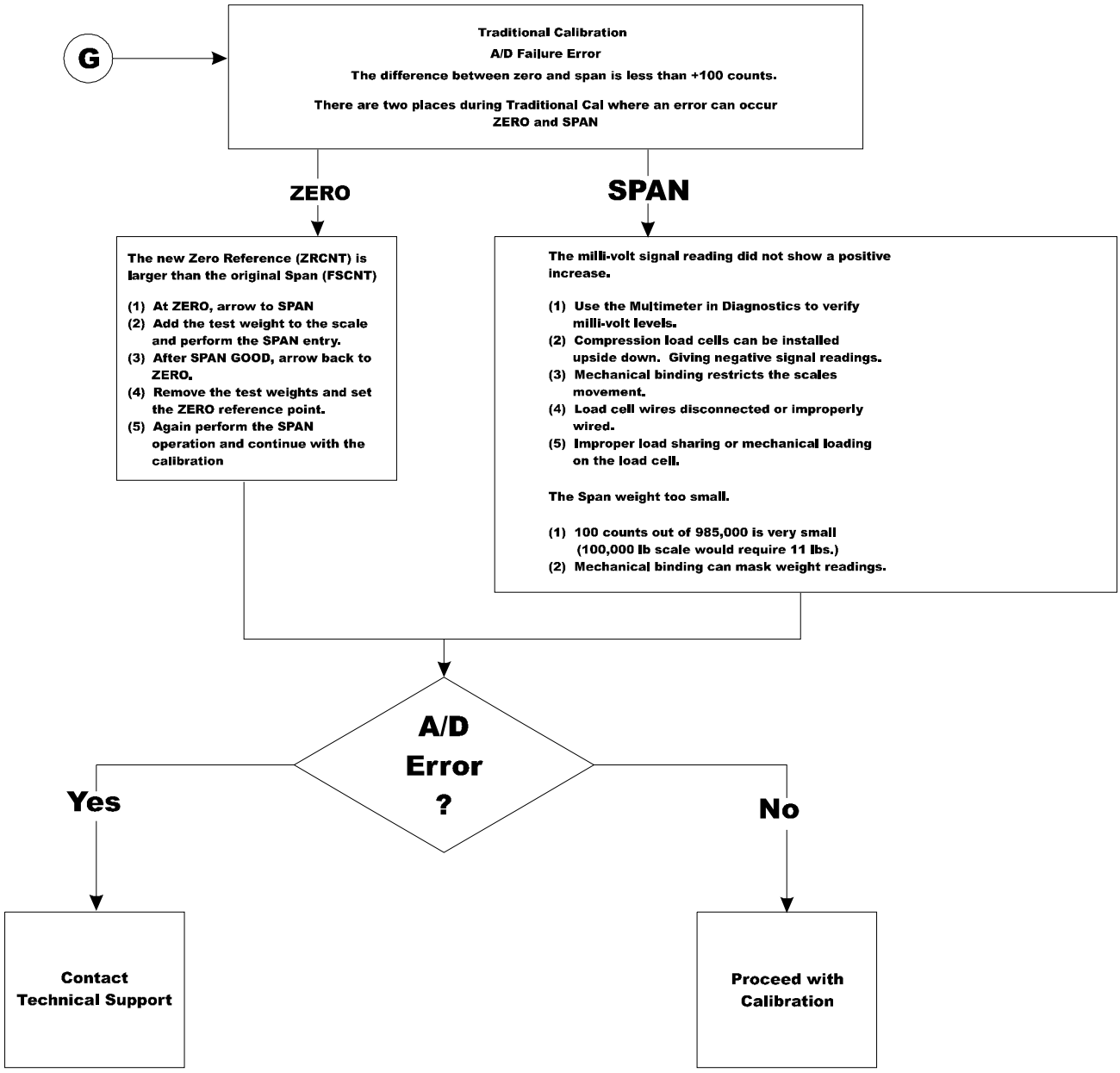

F
Using the load cell certificate, verify the milli volt per volt rating
Example: 3 mV/V load cells will produce approximately 15 mV at full load.
That is 5 volts excitation x 3 mV/V. A scale capacity of 1,000 lbs with 100 lbs
of dead load at empty the load point mV reading should equal 1.5 mV
Using a Multimeter
Physically lift the signal leads to read each load cell's output.
Check individual load sensor output mV readings.
Check load sensor
Record load sensor mV output level for comparison.
NEXT
Repeat for all load sensors
MV readings acceptable?
NO
YES
TEST COMPLETE
MV readings acceptable?
1) No dead load.
Apply load and re-test.
2) Wiring error.
Verify color code using the load cell certificate.
3) Open bridge circuit.
Disconnect power and verify load point bridge resistance reading with an Ohmmeter.
MV readings acceptable?
1) Stressed load cell, remove all load and re-test.
2) Excessive loading.
For additional testing go to:
H
MV readings acceptable?
K
MV readings acceptable?
A
Defective load cell?
Replace and repeat
Test F
If you were unable to determine the Milli-volt readings. Go to
K load sharing
or
Contact Technical Support

F(a) - Verify Individual Load Cell Readings Using INTEGRATED TECHNICIAN™

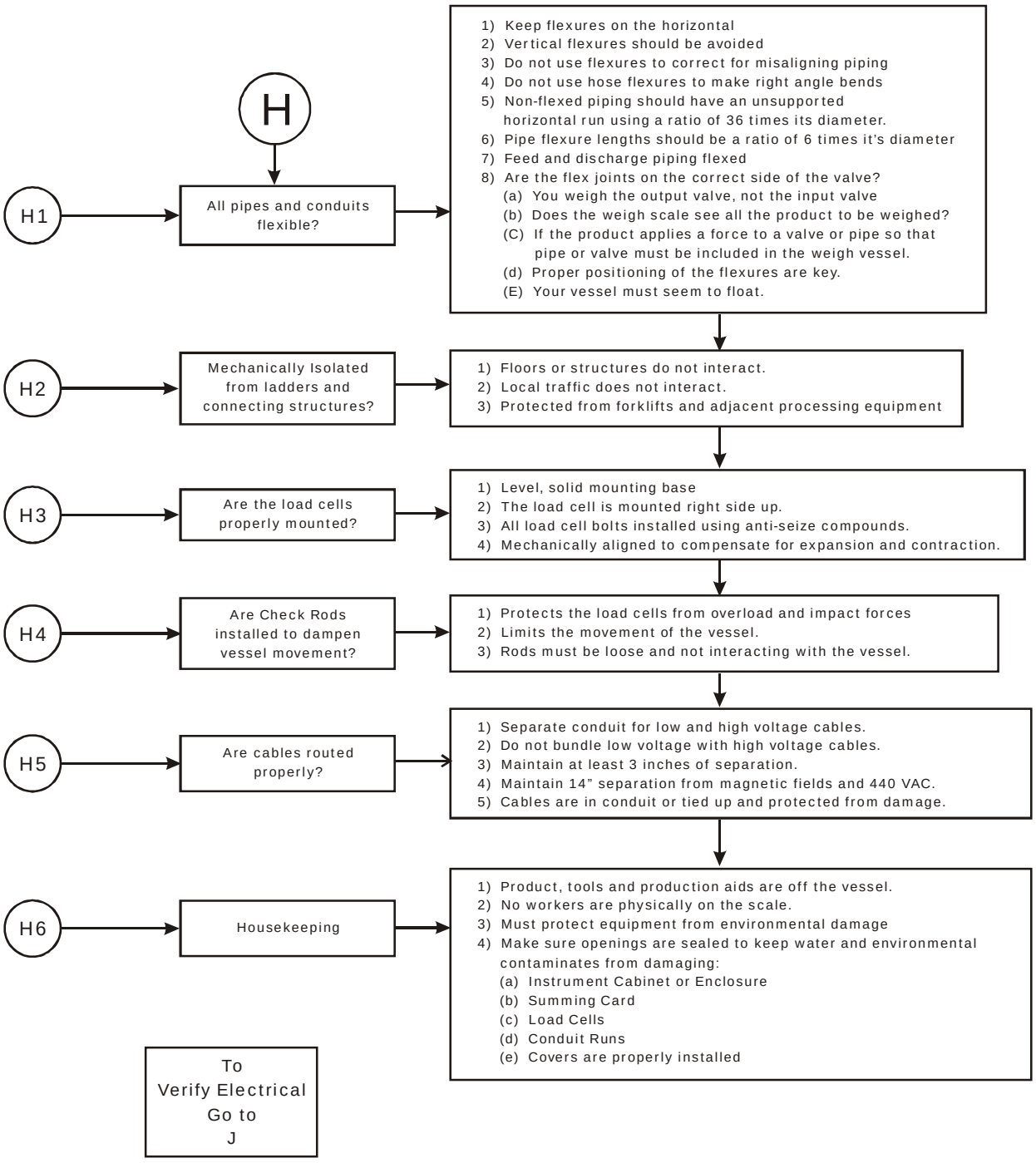

F(a)
Enter Diagnostics Voltage & Weight
Activate the test and review the results.
Read and record each load cell's Signal output
Yes
PASS
No
All signal levels fall within the +0 to +15mV range
The Millivolt range is outside the +0 to +15 mV range
Millivolt reading is slow or 0.0 mV. It may be a negative reading. Use a multi-meter to confirm
Check Wiring
Apply weight and insure all signal voltages increased the same amount
No
B
Replace the load cell if the unit signal readings are out of tolerance.
Check for mechanical reasons, or replace load cell
PASS

INTEGRATED TECHNICIAN is a built-in system diagnostics utility that enables the operator to rapidly troubleshoot a weighing system from the front panel, PDA or Web Browser of the HI 3030. Used with an HI 215IT Junction Box you can read each individual load cell in mV, mV/V and weight to determine if a load sensor is malfunctioning or not connected.

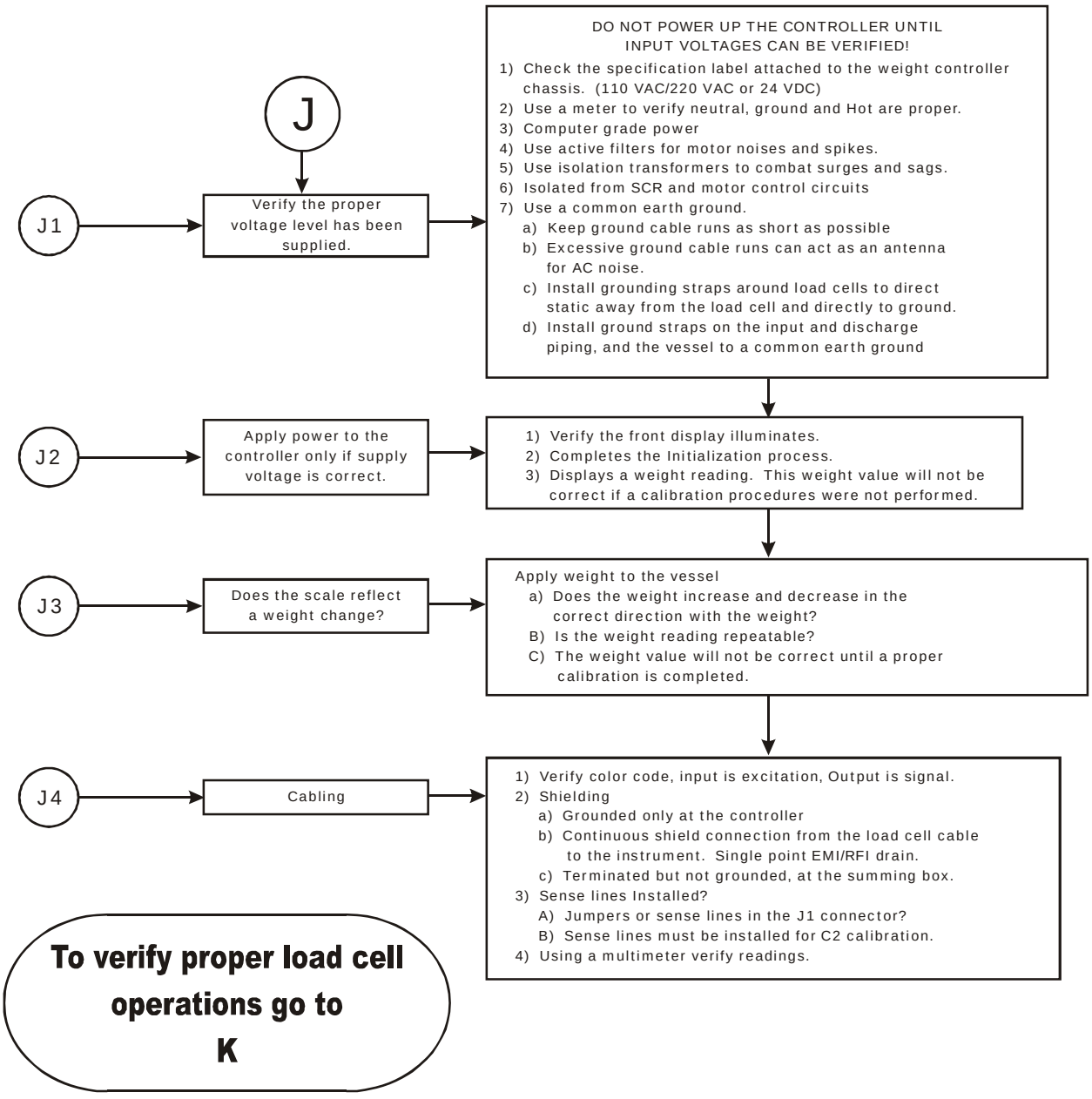
G - A/D Failure Error


G
Traditional Calibration
A/D Failure Error
The difference between zero and span is less than +100 counts.
There are two places during Traditional Cal where an error can occur
ZERO and SPAN
ZERO
SPAN
The new Zero Reference (ZRCNT) is larger than the original Span (FSCNT)
(1) At ZERO, arrow to SPAN
(2) Add the test weight to the scale and perform the SPAN entry.
(3) After SPAN GOOD, arrow back to ZERO.
(4) Remove the test weights and set the ZERO reference point.
(5) Again perform the SPAN operation and continue with the calibration
The milli-volt signal reading did not show a positive increase.
(1) Use the Multimeter in Diagnostics to verify milli-volt levels.
(2) Compression load cells can be installed upside down. Giving negative signal readings.
(3) Mechanical binding restricts the scales movement.
(4) Load cell wires disconnected or improperly wired.
(5) Improper load sharing or mechanical loading on the load cell.
The Span weight too small.
(1) 100 counts out of 985,000 is very small (100,000 lb scale would require 11 lbs.)
(2) Mechanical binding can mask weight readings.
A/D Error ?
Yes
No
Contact Technical Support
Proceed with Calibration

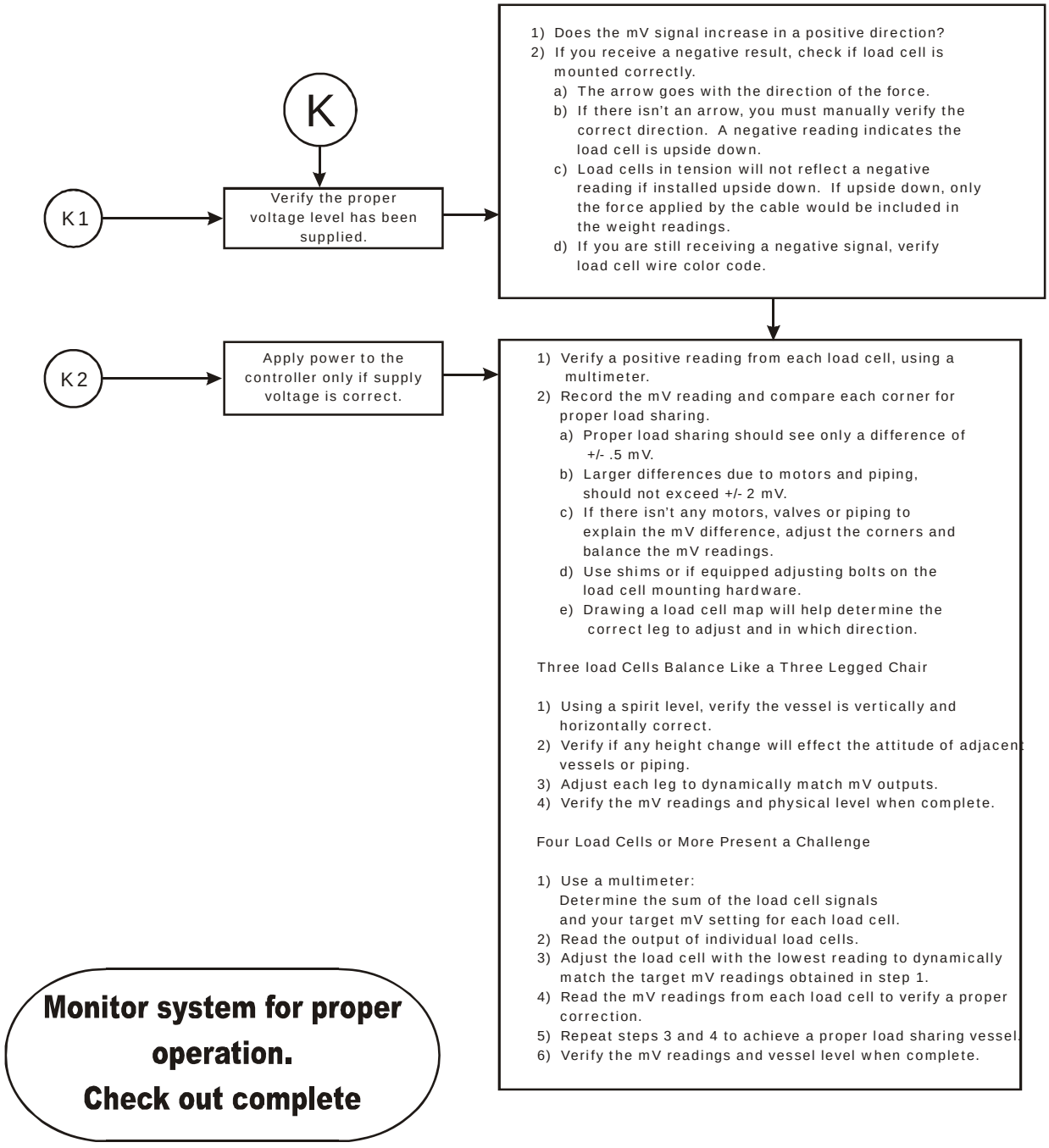
H - Mechanical Inspection


H
H1
All pipes and conduits flexible?
1) Keep flexures on the horizontal
2) Vertical flexures should be avoided
3) Do not use flexures to correct for misaligning piping
4) Do not use hose flexures to make right angle bends
5) Non-flexed piping should have an unsupported horizontal run using a ratio of 36 times its diameter.
6) Pipe flexure lengths should be a ratio of 6 times it's diameter
7) Feed and discharge piping flexed
8) Are the flex joints on the correct side of the valve?
(a) You weigh the output valve, not the input valve
(b) Does the weigh scale see all the product to be weighed?
(C) If the product applies a force to a valve or pipe so that pipe or valve must be included in the weigh vessel.
(d) Proper positioning of the flexures are key.
(E) Your vessel must seem to float.
H2
Mechanically Isolated from ladders and connecting structures?
1) Floors or structures do not interact.
2) Local traffic does not interact.
3) Protected from forklifts and adjacent processing equipment
H3
Are the load cells properly mounted?
1) Level, solid mounting base
2) The load cell is mounted right side up.
3) All load cell bolts installed using anti-seize compounds.
4) Mechanically aligned to compensate for expansion and contraction.
H4
Are Check Rods installed to dampen vessel movement?
1) Protects the load cells from overload and impact forces
2) Limits the movement of the vessel.
3) Rods must be loose and not interacting with the vessel.
H5
Are cables routed properly?
1) Separate conduit for low and high voltage cables.
2) Do not bundle low voltage with high voltage cables.
3) Maintain at least 3 inches of separation.
4) Maintain 14" separation from magnetic fields and 440 VAC.
5) Cables are in conduit or tied up and protected from damage.
H6
Housekeeping
1) Product, tools and production aids are off the vessel.
2) No workers are physically on the scale.
3) Must protect equipment from environmental damage
4) Make sure openings are sealed to keep water and environmental contaminates from damaging:
(a) Instrument Cabinet or Enclosure
(b) Summing Card
(c) Load Cells
(d) Conduit Runs
(e) Covers are properly installed
To Verify Electrical Go to J

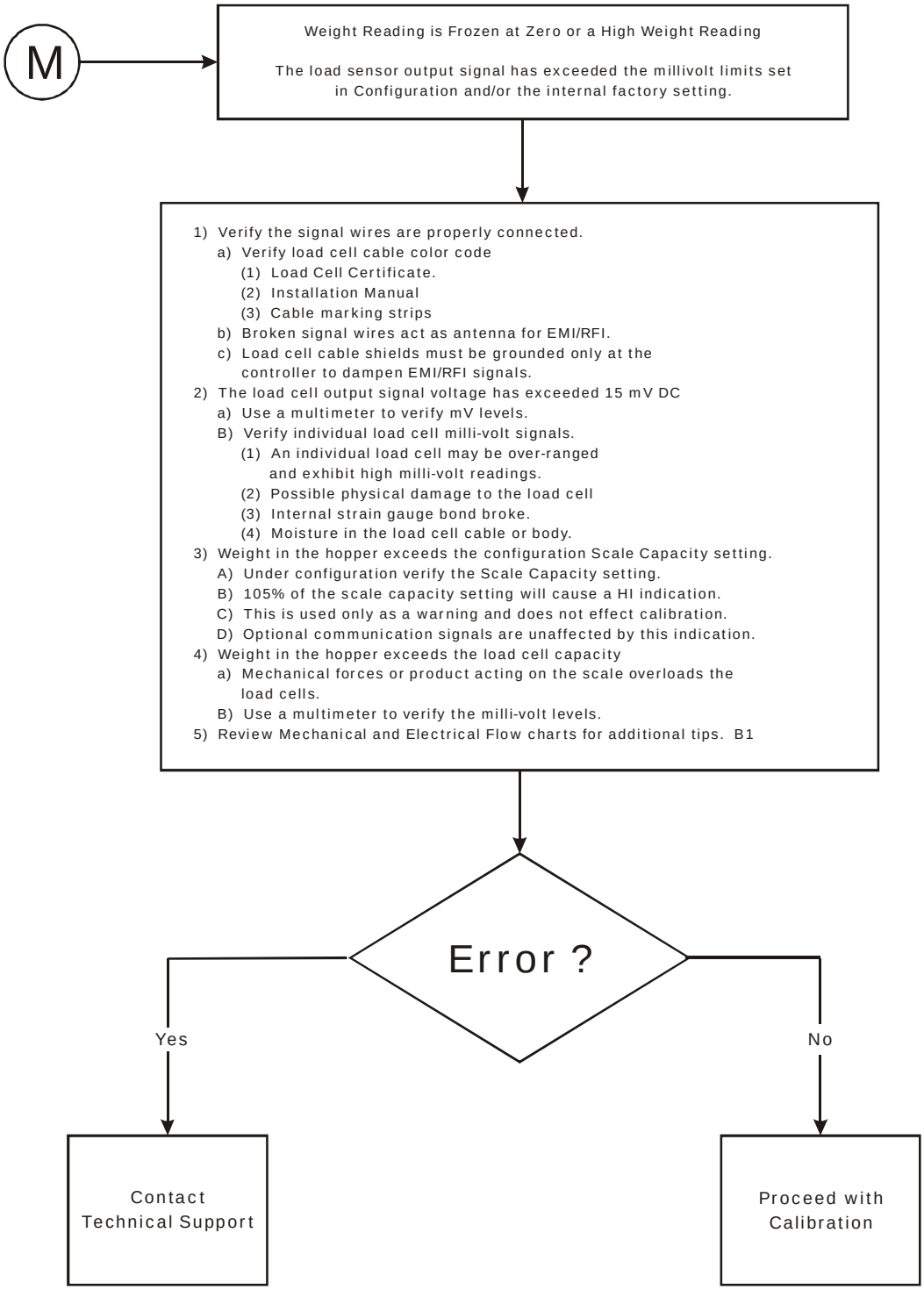
J - Electrical Inspection


J
J1
Verify the proper voltage level has been supplied.
DO NOT POWER UP THE CONTROLLER UNTIL INPUT VOLTAGES CAN BE VERIFIED!
1) Check the specification label attached to the weight controller chassis. (110 VAC/220 VAC or 24 VDC)
2) Use a meter to verify neutral, ground and Hot are proper.
3) Computer grade power
4) Use active filters for motor noises and spikes.
5) Use isolation transformers to combat surges and sags.
6) Isolated from SCR and motor control circuits
7) Use a common earth ground.
a) Keep ground cable runs as short as possible
b) Excessive ground cable runs can act as an antenna for AC noise.
c) Install grounding straps around load cells to direct static away from the load cell and directly to ground.
d) Install ground straps on the input and discharge piping, and the vessel to a common earth ground
J2
Apply power to the controller only if supply voltage is correct.
1) Verify the front display illuminates.
2) Completes the Initialization process.
3) Displays a weight reading. This weight value will not be correct if a calibration procedures were not performed.
J3
Does the scale reflect a weight change?
Apply weight to the vessel
a) Does the weight increase and decrease in the correct direction with the weight?
B) Is the weight reading repeatable?
C) The weight value will not be correct until a proper calibration is completed.
J4
Cabling
1) Verify color code, input is excitation, Output is signal.
2) Shielding
a) Grounded only at the controller
b) Continuous shield connection from the load cell cable to the instrument. Single point EMI/RFI drain.
c) Terminated but not grounded, at the summing box.
3) Sense lines Installed?
A) Jumpers or sense lines in the J1 connector?
B) Sense lines must be installed for C2 calibration.
4) Using a multimeter verify readings.
To verify proper load cell operations go to K

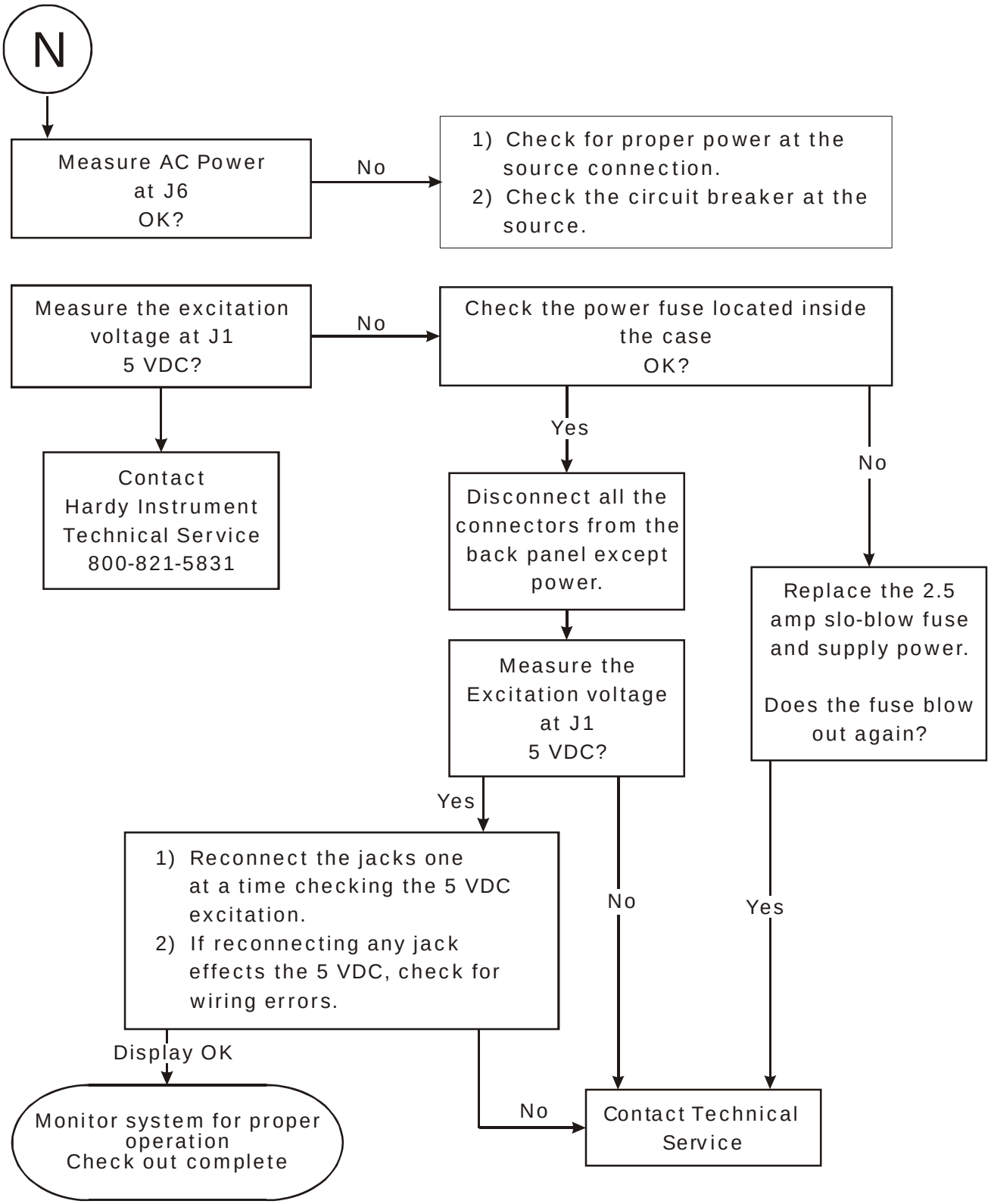
K - Load Sharing and Load Sensor Check-out


K
K1
Verify the proper voltage level has been supplied.
1) Does the mV signal increase in a positive direction?
2) If you receive a negative result, check if load cell is mounted correctly.
a) The arrow goes with the direction of the force.
b) If there isn't an arrow, you must manually verify the correct direction. A negative reading indicates the load cell is upside down.
c) Load cells in tension will not reflect a negative reading if installed upside down. If upside down, only the force applied by the cable would be included in the weight readings.
d) If you are still receiving a negative signal, verify load cell wire color code.
K2
Apply power to the controller only if supply voltage is correct.
1) Verify a positive reading from each load cell, using a multimeter.
2) Record the mV reading and compare each corner for proper load sharing.
a) Proper load sharing should see only a difference of +/- .5 mV.
b) Larger differences due to motors and piping, should not exceed +/- 2 mV.
c) If there isn't any motors, valves or piping to explain the mV difference, adjust the corners and balance the mV readings.
d) Use shims or if equipped adjusting bolts on the load cell mounting hardware.
e) Drawing a load cell map will help determine the correct leg to adjust and in which direction.
Three load Cells Balance Like a Three Legged Chair
1) Using a spirit level, verify the vessel is vertically and horizontally correct.
2) Verify if any height change will effect the attitude of adjacent vessels or piping.
3) Adjust each leg to dynamically match mV outputs.
4) Verify the mV readings and physical level when complete.
Four Load Cells or More Present a Challenge
1) Use a multimeter:
Determine the sum of the load cell signals and your target mV setting for each load cell.
2) Read the output of individual load cells.
3) Adjust the load cell with the lowest reading to dynamically match the target mV readings obtained in step 1.
4) Read the mV readings from each load cell to verify a proper correction.
5) Repeat steps 3 and 4 to achieve a proper load sharing vessel.
6) Verify the mV readings and vessel level when complete.
Monitor system for proper operation.
Check out complete

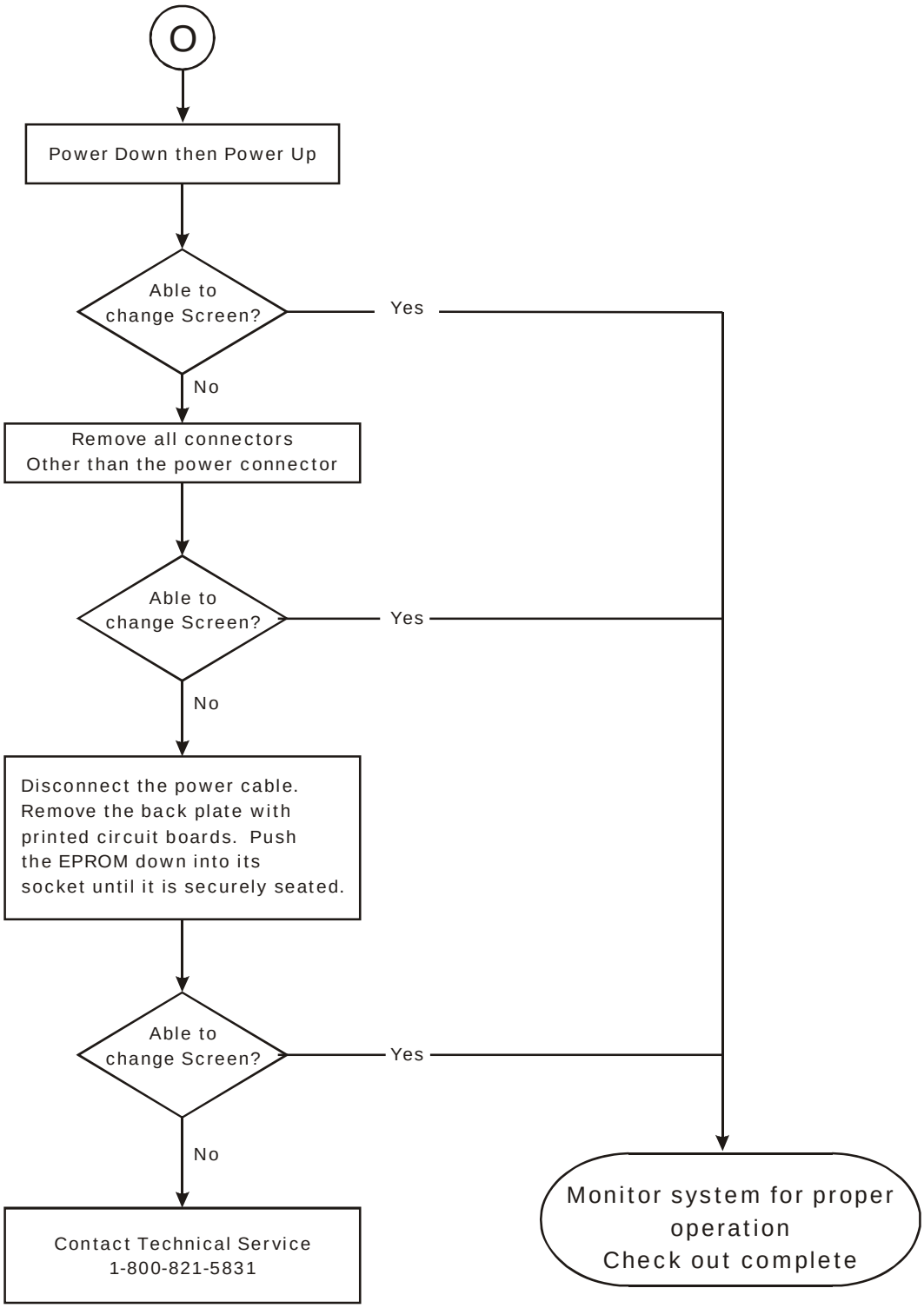
M - Weight Reading Stops Incrementing


M
Weight Reading is Frozen at Zero or a High Weight Reading
The load sensor output signal has exceeded the millivolt limits set in Configuration and/or the internal factory setting.
1) Verify the signal wires are properly connected.
a) Verify load cell cable color code
(1) Load Cell Certificate.
(2) Installation Manual
(3) Cable marking strips
b) Broken signal wires act as antenna for EMI/RFI.
c) Load cell cable shields must be grounded only at the controller to dampen EMI/RFI signals.
2) The load cell output signal voltage has exceeded 15 mV DC
a) Use a multimeter to verify mV levels.
B) Verify individual load cell milli-volt signals.
(1) An individual load cell may be over-ranged and exhibit high milli-volt readings.
(2) Possible physical damage to the load cell
(3) Internal strain gauge bond broke.
(4) Moisture in the load cell cable or body.
3) Weight in the hopper exceeds the configuration Scale Capacity setting.
A) Under configuration verify the Scale Capacity setting.
B) 105% of the scale capacity setting will cause a HI indication.
C) This is used only as a warning and does not effect calibration.
D) Optional communication signals are unaffected by this indication.
4) Weight in the hopper exceeds the load cell capacity
a) Mechanical forces or product acting on the scale overloads the load cells.
B) Use a multimeter to verify the milli-volt levels.
5) Review Mechanical and Electrical Flow charts for additional tips. B1
Error ?
Yes
No
Contact Technical Support
Proceed with Calibration

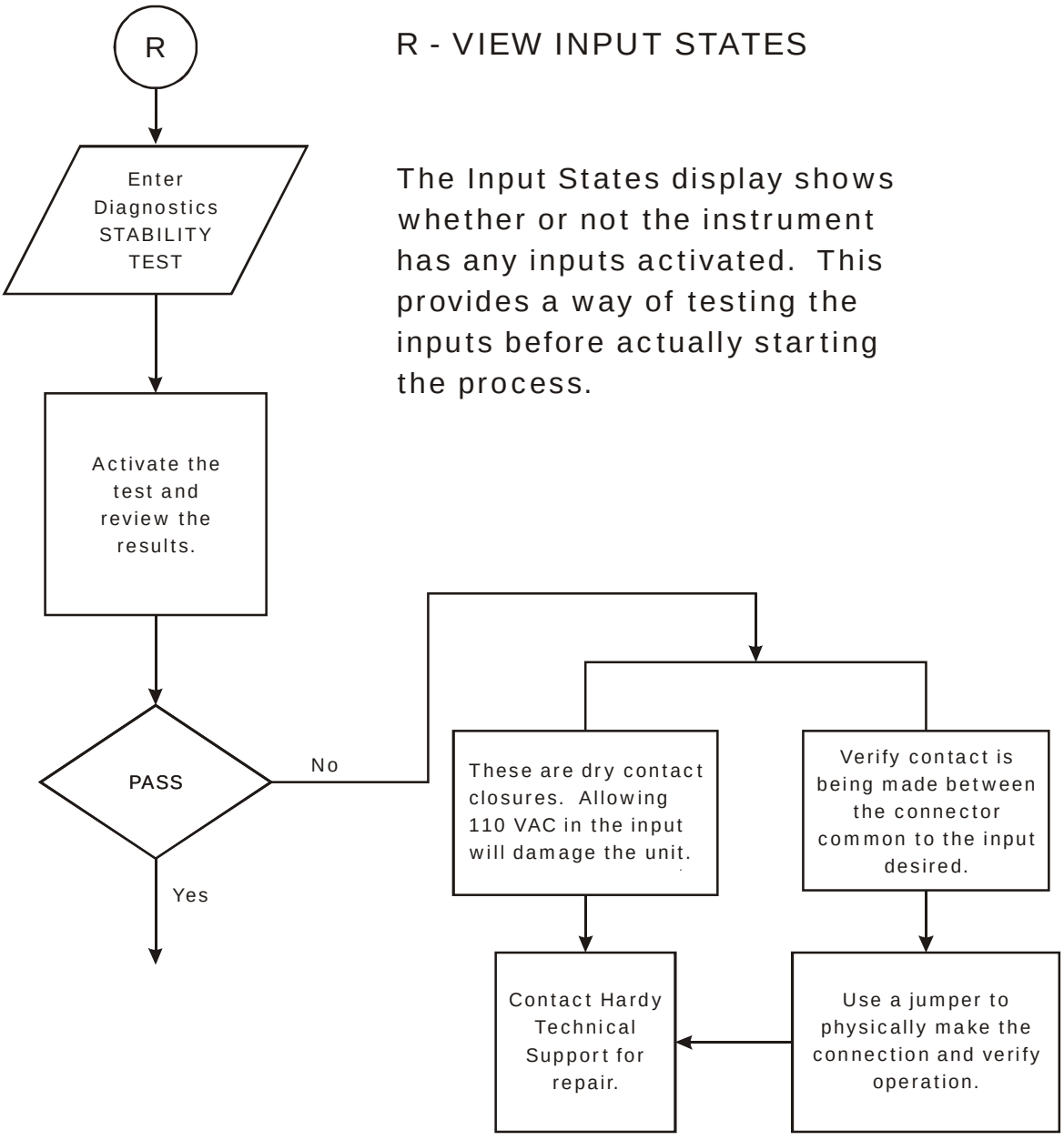
N - Blank Screen


N
Measure AC Power at J6 OK?
No
1) Check for proper power at the source connection.
2) Check the circuit breaker at the source.
Measure the excitation voltage at J1 5 VDC?
No
Check the power fuse located inside the case OK?
Yes
No
Contact Hardy Instrument Technical Service 800-821-5831
Disconnect all the connectors from the back panel except power.
Replace the 2.5 amp slo-blow fuse and supply power.
Does the fuse blow out again?
Measure the Excitation voltage at J1 5 VDC?
Yes
No
Yes
1) Reconnect the jacks one at a time checking the 5 VDC excitation.
2) If reconnecting any jack effects the 5 VDC, check for wiring errors.
Display OK
No
Monitor system for proper operation Check out complete
Contact Technical Service

O - Display Stuck on a Screen


O
Power Down then Power Up
Able to change Screen?
Yes
No
Remove all connectors Other than the power connector
Able to change Screen?
Yes
No
Disconnect the power cable. Remove the back plate with printed circuit boards. Push the EPROM down into its socket until it is securely seated.
Able to change Screen?
Yes
No
Contact Technical Service 1-800-821-5831
Monitor system for proper operation Check out complete

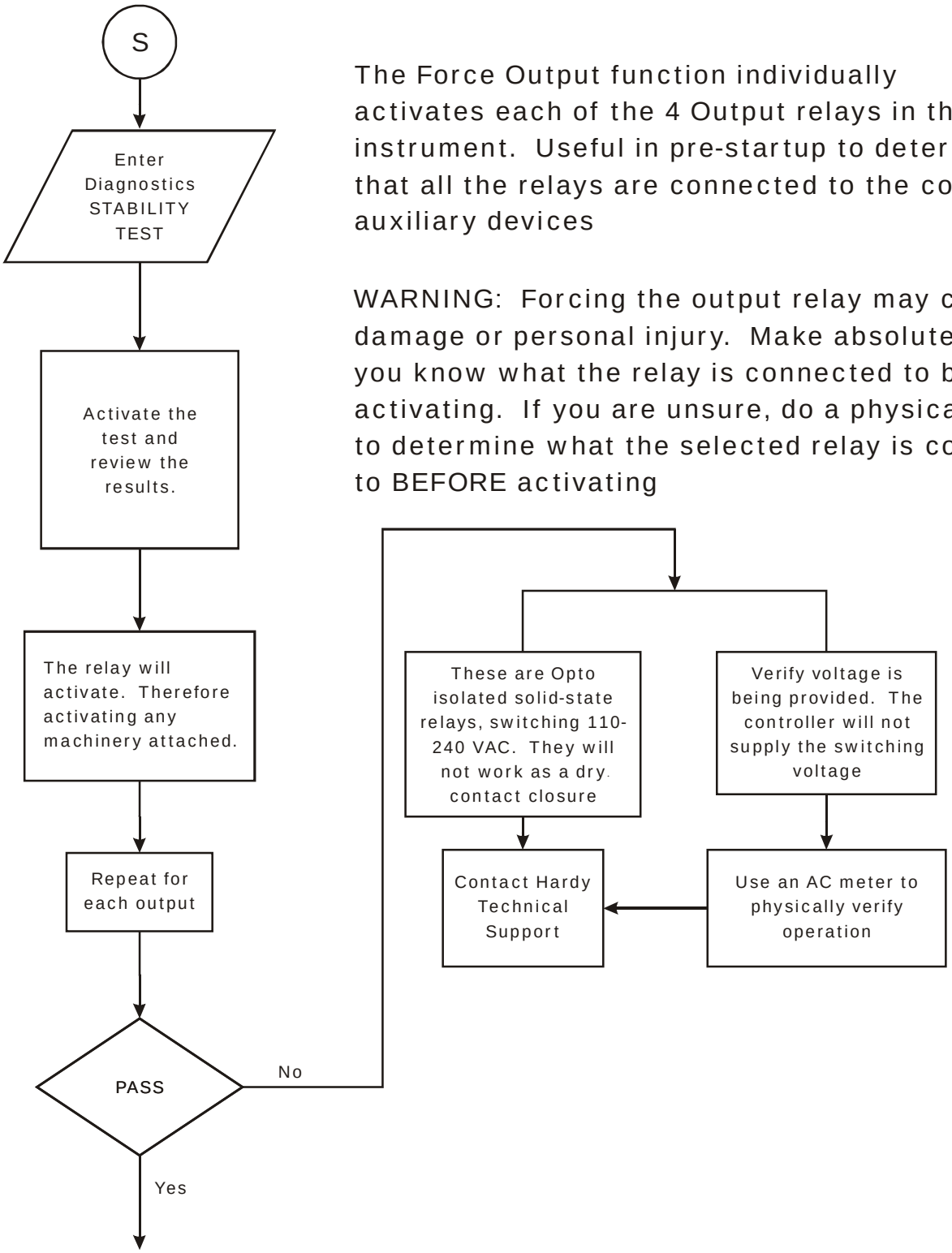
R - View Input States


R
Enter Diagnostics STABILITY TEST
Activate the test and review the results.
PASS
No
Yes
These are dry contact closures. Allowing 110 VAC in the input will damage the unit.
Verify contact is being made between the connector common to the input desired.
Contact Hardy Technical Support for repair.
Use a jumper to physically make the connection and verify operation.

R - VIEW INPUT STATES

The Input States display shows whether or not the instrument has any inputs activated. This provides a way of testing the inputs before actually starting the process.

S - Forcing Outputs


S
Enter Diagnostics STABILITY TEST
Activate the test and review the results.
The relay will activate. Therefore activating any machinery attached.
Repeat for each output
PASS
No
Yes
These are Opto isolated solid-state relays, switching 110-240 VAC. They will not work as a dry contact closure
Verify voltage is being provided. The controller will not supply the switching voltage
Contact Hardy Technical Support
Use an AC meter to physically verify operation

The Force Output function individually activates each of the 4 Output relays in the instrument. Useful in pre-startup to determine that all the relays are connected to the correct auxiliary devices

WARNING: Forcing the output relay may cause damage or personal injury. Make absolutely sure you know what the relay is connected to before activating. If you are unsure, do a physical check to determine what the selected relay is connected to BEFORE activating

System Integrity Check and Fault Determination From the Front Panel

To determine if an instrument or cabling problem exists, verify the basic operation of the system by performing the following system checks.

Diagnostics

About Diagnostics

The Diagnostics menus enable the technician to get a more complete view of how the Weight Controller and scale are working. For example you can check to see the last Calibration, the type of calibration and when the last Calibration was performed. You can view the Data List Display for the Serial Number assigned to the instrument or Program Part Number. You can also check the last graduation size, Units selected, Operator ID, Analog Options and more information about the configuration of the instrument you are checking. You can get information about the Load Sensors such as Output Sensitivity, Hysteresis, Sensitivity of each individual Load Sensor. Many of the Menu Items will allow you to change them. If a Menu Item has an asterisk (*) in front of it then you can change this item. The Diagnostic Menus allow you to perform a Self Test which provides the total scale input to the instrument such as mV and Weight, mV/V and Weight and mV/V for the units selected (i.e. lbs, kg, oz, g). INTEGRATED TECHNICIAN© enables you to totally diagnose a weighing system to determine the source of a problem should one occur.

Checking the Device Data List

The Device Data List is a list of all the parameters that were set for the ingredient you are currently using and the instrument parameters that have been set for this instrument. Any parameters that have an asterisk (*) in front of it can be changed from the Test Data Menu.

Step 1. From the Standby Display press the Test/9 button. The Test and Data Menu appears with the cursor in front of Device Data List. (See Fig. 7-1)

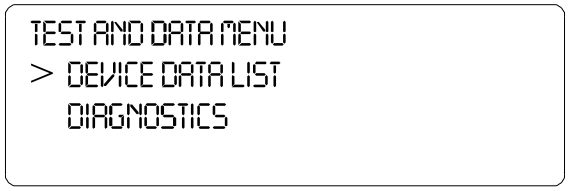


FIG. 7-1 TEST AND DATA MENU/SELECTING DEVICE DATA LIST

Step 2. Press the Enter button. The Device Data List Display appears with the cursor in front of Instrument ID. (See Fig. 7-2)

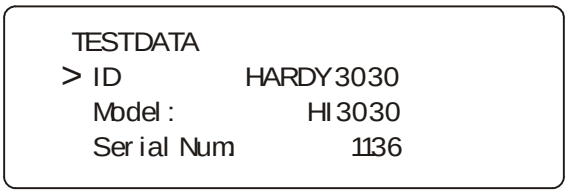


FIG. 7-2 TEST DATA DISPLAY/INSTRUMENT ID - MODEL NUMBER - S/N

Step 3. Here you can view the Instrument ID, Model Number and Instrument Serial Number of the instrument. This is a read only display. To change any of the parameters you will have to go to the Setup Menu/Instrument ID.

Step 4. Press the down arrow button until the next three parameters appears. (See Fig. 7-3)

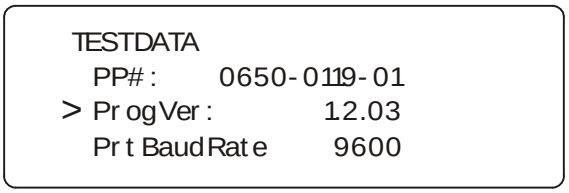


FIG. 7-3 TEST DATA DISPLAY/PROGRAM VERSION/PRINTER BAUD RATE

Step 5. These are read only displays. The information is important:

- PP# = Program Part Number. This is the part number of the firmware. To order additional copies of the firmware you will need this number. This is also additional information available to a service technician for troubleshooting.
- Often a technician needs to know the program version to determine if the correct version is being used. A Hardy Technical Support Technician will ask what version of software you are currently using to determine the source of a problem. You can find the version here.
- Prt Baud Rate (Printer Baud Rate) - Indicates the Baud Rate for the printer.

Step 6. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-4)

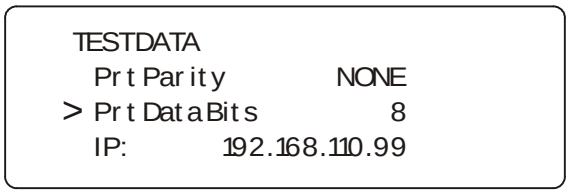


FIG. 7-4 TEST DISPLAY/PRINTER PARITY - PRINTER DATA BITS - IP ADDRESS

- Printer Parity - Indicates the parity setting for the printer (Odd, Even, None).
- Printer Data Bits - Indicates the Data Bit setting for the printer.
- IP - Lists the IP address for this instrument. The address listed in Fig. 7-4 is the default IP address of an instrument right from the factory.

Step 7. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-5)

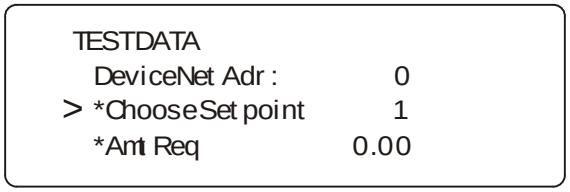


FIG. 7-5 TEST DATA/DEVICENET ADDRESS - CHOOSE SETPOINT - AMOUNT REQUIRED

- Devicenet Address - Lists the Node Address of the instrument you are checking.
- Choose Setpoint - Note this parameter has an asterisk (*) in front of it. This means that the value for this parameter or any parameter with an asterisk can be changed

  1. Press the right or left arrow buttons you can select a setpoint (range is 1-12).
  2. Press the Enter button to set the entry.

- Amt Req (Amount Required) - The Amount Required is the weight required for your process.

  1. To change the Amount Required press the Clr (Clear) button.
  2. Use the alphanumeric key pad and enter the new Amount Required.
  3. Press the Enter button to set the entry.

Step 8. Press the down arrow to move to the next 3 parameters. (See Fig. 7-6)

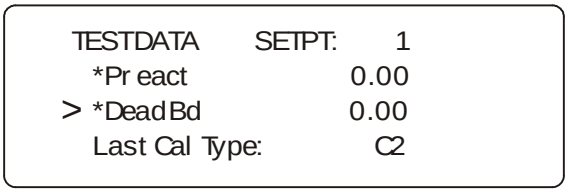


FIG. 7-6 TEST DATA SETPT: 1/PREACT - DEAD BAND - LAST CAL TYPE

- Preact - The number of units above or below the set point value where you want the relay to trip. Use as an “in flight” compensation value. Enter a negative number for Gain in Weight Applications and a positive number for Loss in Weight Applications.

  1. Press the Clear button.
  2. For Gain in Weight Preact settings, press the User/./-/_/@ button two (2) times. Use the alphanumeric keypad to enter the negative value.
  3. For Loss in Weight Preact settings, use the alphanumeric keypad to enter the positive value.
  4. Press the Enter button to set the entry.

- Dead Bd (Dead Band) - Is a value used to prevent relay chatter once the setpoint is reached. The Dead Band must be larger than the Preact,

  1. Press the Clear button.
  2. Now use the alphanumeric keypad to enter the new Dead Band value.

- Last Cal Type - Lists the type of calibration last performed (C2, Trad or None). This is a read only parameter and cannot be changed from this menu.

Step 9. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-7 & Fig. 7-8)

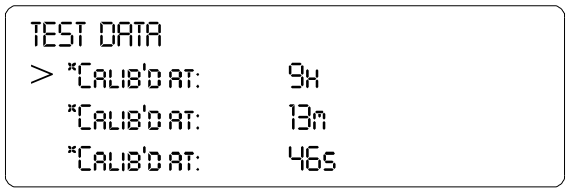


FIG. 7-7 TEST DATA/LAST CALIBRATION TIME

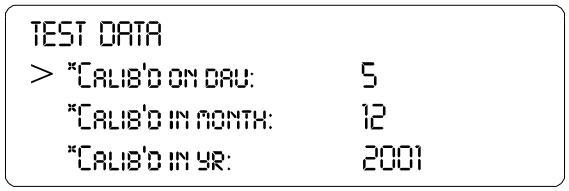


FIG. 7-8 TEST DATA/LAST CALIBRATION DAY/ MONTH/YEAR

- The Calibration time and date lists the time and date the instrument was last calibrated. This is menu is read only and cannot be changed from this menu. The Cal time is important to determine if the instrument needs calibration to correct a problem with the scale. If a calibration has not been done for a long time it is time to re-calibrate the instrument.

Step 10. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-9)

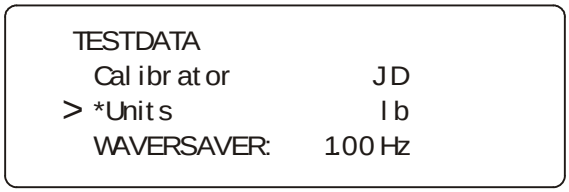


FIG. 7-9 TEST DISPLAY/CALIBRATOR - UNITS - WAVERSAVER®

- The Calibrator is read only and lists the person who last calibrated the instrument.

- Press the up or down arrow until the cursor is in front of *Units.

  1. This display shows the last selected Unit. Press the left or right arrow buttons to select the Units you want. The selections are lbs, kg, oz, g.
  2. Press the Enter button to set the entry.
  3. Press the down arrow to move to the next parameter you want to view or change.

- Press the up or down arrow until the cursor is in front of *WAVERSAVER. This display shows the last WAVERSAVER selection.

  1. Press the left or right arrow buttons to select the WAVERSAVER selection you want.
  2. Press the Enter button to set the entry.
  3. Press the down arrow to move to the next parameter.

Step 11. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-10)

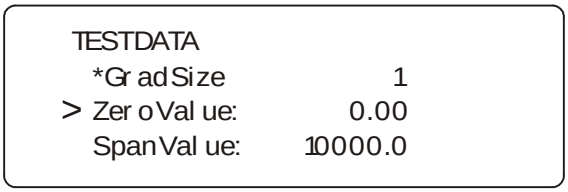


FIG. 7-10 TEST DATA DISPLAY/GRADUATION SIZE - ZERO VALUE - SPAN VALUE

- The Zero Value and Span Value are read only. The Graduation Size, Zero Value and Span Value are for the last traditional calibration only. The *Grad Size (Graduations) can be changed.

- Grad Size - Minimum increment displayed by the instrument.

  1. This display shows the last selected Graduation size. Press the left or right arrow buttons to select the Units you want. The selections are 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000.
  2. Press the Enter button to set the entry.
  3. Press the down arrow to move to Zero Value

- Zero Value - This is the value used when zeroing the scale with no material in the vessel or on the scale when performing a traditional calibration.
- Span Value - This is the value used when putting between 80% - 100% of the scale capacity when performing a traditional calibration.

Step 12. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-11)

CAUTION: CHANGING THE ZERO COUNT CAN NULLIFY YOUR CALIBRATION. ONLY SERVICE PERSONNEL SHOULD MAKE ANY CHANGES THE ZERO COUNT, SPAN COUNT OR C2 SENSITIVITY.

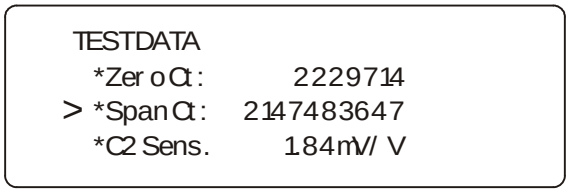


FIG. 7-11 TEST DATA DISPLAY/ZERO COUNT - SPAN COUNT - C2 SENSITIVITY

- *Span Count, *C2 Sensitivity, *Scale Capacity can all be changed.
- The Zero Count is the stored A/D counts on the last calibration zero.

  1. To clear the Zero Count press the Clr (Clear) button.
  2. Use the alphanumeric key pad to enter the new Zero Count value

CAUTION: ZERO COUNTS MUST BE LESS THAN SPAN COUNTS.

  3. Press the Enter button to set the entry.
  4. Press the down arrow to move to the next parameter you want to view or change.
  5. If you get an error during calibration, change Zero Count to 50,000 to clear the calibration error, then recalibrate.

- Press the up or down arrow until the cursor is in front of *Span Count.

CAUTION: CHANGING THE SPAN COUNT CAN NULLIFY YOUR CALIBRATION.

- The Span Count are the A/D counts on the last C2 (full scale) or Traditional (Span) calibration.

  1. To clear the Span Count press the Clr (Clear) button.
  2. Press the Enter button to set the entry.
  3. Change the Span Count to a large number (1,000,000.00) to clear calibration errors, then re-calibrate.

CAUTION: SPAN COUNTS MUST BE LARGER THAN THE ZERO COUNTS.

- The C2 Sensitivity is the full scale output sensitivity of C2 load sensor measured at the factory.

  1. To change the sensitivity press the Clr (Clear) button.
  2. Use the alphanumeric key pad and enter the sensitivity specifications that comes with new load sensors and enter the full scale output sensitivity of the C2 load sensors.
  3. Press the Enter button to set the entry.
  4. Press the down arrow to move to the next parameter you want to view or change.

Step 13. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-12)

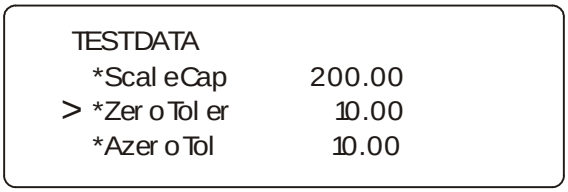


FIG. 7-12 TEST DATA DISPLAY/SCALE CAPACITY - ZERO TOLERANCE - AUTO ZERO TOLERANCE

- *Scale Capacity,*Zero Tolerance and *Auto Zero Tolerance can all be changed from this menu.
  5.
- Scale Capacity - The maximum weight the scale is rated for.

  1. To change the Scale Capacity click on clear.
  2. Use the alphanumeric key pad and enter the new scale capacity.
  3. Press the Enter button to set the entry.

- Zero Tolerance - The number of graduations from zero that will be accepted as zero by the instrument.
  1. To clear the Zero Tolerance press the Clr (Clear) button.
  2. Use the alphanumeric key pad and enter the new Zero Tolerance.
  3. Press the Enter button to set the entry.

- Auto Zero Tolerance - When Auto Zero is enabled, automatically zeros the gross

weight as long as the weight is within the zero tolerance for your process.

1. To change the Auto Zero Tolerance press the Clr (Clear) button.
2. Use the alphanumeric key pad and enter the new Auto Zero Tolerance.
3. Press the Enter button to set the entry.
4. Press the down arrow to move to the next parameter you want to view or change.

Step 14. Press the down arrow button until the next three menu items are displayed. (See Fig. 7-13)

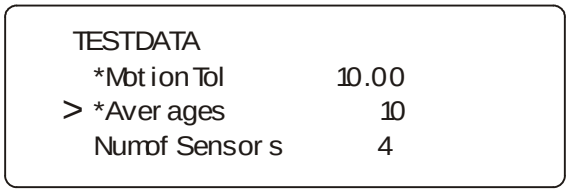


FIG. 7-13 TEST DATA DISPLAY/MOTION TOLERANCE - AVERAGES - NUMBER OF SENSORS

Step 15. *Motion Tolerance, *Averages can be changed from this menu. Number of Sensors is read only and cannot be changed.

- Motion Tolerance - The allowable deviation between consecutive weight readings.

  1. To change the Motion Tolerance press the Clr (Clear) button.
  2. Use the alphanumeric key pad and enter the new Motion Tolerance.
  3. Press the Enter button to set the entry.
  4. Press the down arrow to move to the next parameter you want to view or change.

- Averages - The Number of weight readings used to compute displayed weight.

  1. To change the Averages press the Clr (Clear) button.
  2. Use the alphanumeric key pad and enter the new Averages.
  3. Press the Enter button to set the entry.

- Number of Sensors - Lists the number of C2 load sensors that are connected to the the channel and instrument you are checking.

Step 16. Press the down arrow button until the cursor is in front of Load Sensor. (See Fig. 7-14)

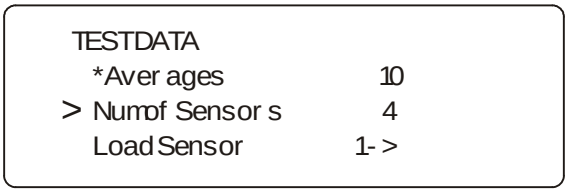


FIG. 7-14 TEST DATA/AVERAGES - NUMBER OF SENSORS - LOAD SENSOR

- Load Sensor 1 - The instrument will read C2 load sensors certification information only.
  1. The instrument displays sensor number 1 as a default.
  2. If you want to look at the certified specifications for other load sensors press the up or down arrows to move the list of sensors. The instrument can detect a maximum of 32 sensors per scale.
  3. To view the certified sensor information which is read from the C2 chip, do the following:
     a. Press the Enter button. The Load Sensor Display appears. (See Fig. 7-15)

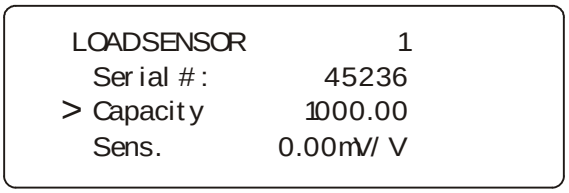


FIG. 7-15 LOAD SENSOR DISPLAY/SERIAL NUMBER - CAPACITY - SENSITIVITY (MV/V)

     b. Serial Number - This is the serial number of the selected load sensor for this channel. In our example we selected channel 1.
     c. Capacity - the maximum weighing capacity of the load sensor.
     d. Sensitivity - Sensitivity specification of the load sensor set at the factory.
     e. Press the down arrow until the remainder of the load sensor specifications appear. (See Fig. 7-16)

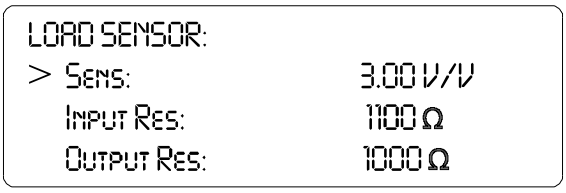


FIG. 7-16 SENSITIVITY - INPUT RESISTANCE - OUTPUT RESISTANCE

f. Input Resistance - This is the Certified Input Resistance from the certification done by the factory.
g. This is the Certified Output Resistance from the certification

Step 17. Press the Exit button to return to the Test Data Display.
Step 18. Press the Exit button to return to the Test and Data Menu. (See Fig.7-17)

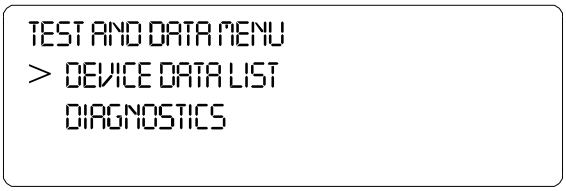


FIG. 7-17 TEST AND DATA MENU

Diagnostics

INTEGRATED TECHNICIAN™ (IT®)

INTEGRATED TECHNICIAN™ is a built-in system diagnostics utility that enables the operator to rapidly troubleshoot a weighing system from the front panel or Web Page of the HI 3030. Used with an HI 215IT Junction Box you can read each individual load cell in mV, mV/V, and weight to determine if a load sensor is malfunctioning or not connected.

Using IT From the Front Panel

Step 1. From the Summary Display, press the up or down arrow buttons until the cursor is in front of the scale you want to diagnose. In our example we selected Scale 1. (See Fig. 7-18)

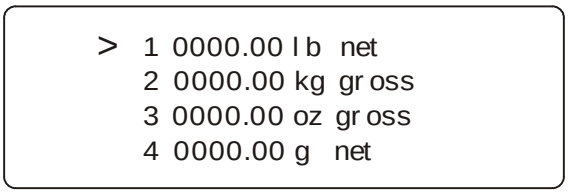


FIG. 7-18 SUMMARY DISPLAY/SELECTING SCALE NUMBER 1

Step 2. Press the Test/9 button. The Test and Data Menu appears. (See Fig. 7-19)

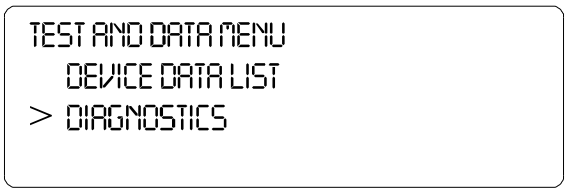


FIG. 7-19 TEST AND DATA MENU/SELECTING DIAGNOSTICS

Step 3. Press the down arrow until the cursor is in front of Diagnostics. (See Fig. 7-19)
Step 4. Press the Enter button. The Diagnostics Display appears with the cursor in front of Voltage & Weight. (See Fig. 7-20)

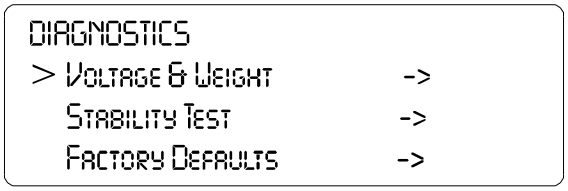


FIG. 7-20 DIAGNOSTICS DISPLAY/SELECTING VOLTAGE & WEIGHT

Step 5. To test the Voltage and Weight Press the enter button. Voltage & Weight briefly turn to !! TESTING!! while the test is performed. (See Fig. 7-21)

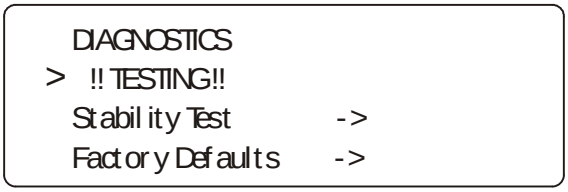


FIG. 7-21 DIAGNOSTICS DISPLAY/VOLTAGE & WEIGHT TESTING DISPLAY

Step 6. The Scale # Screen appears with the total MilliVolt (mV), Milli-Volt/Volt (mV/V) and Weight (lb kg, gr., oz) readings from the load sensors that are connected to the selected Scale. In our example it is Scale #1. (See fig. 7-22)

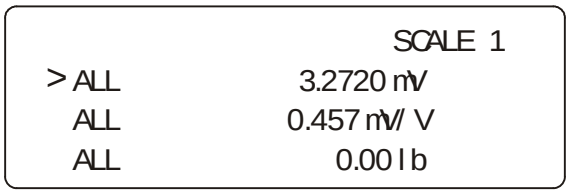


FIG. 7-22 SCALE #1 WITH TOTALS DISPLAYED

Step 7. If you connected the load sensors directly to the HI 3030 without using the HI 215IT Junction Box, Fig. 7-22 is displayed.

Step 8. If you are using IT and connected the load sensors to an HI 215IT Junction Box the Scale #1 display appears with arrows to the right of each category. (See Fig. 7-23)

NOTE: The values listed here are for illustration purposes only. Your readings will be different.

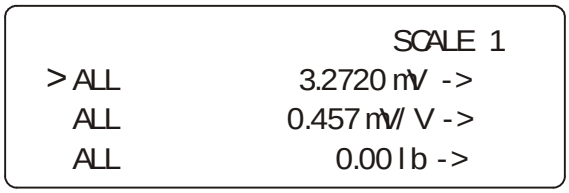


FIG. 7-23 SCALE #1 WITH TOTALS DISPLAYED AND HI 215IT JUNCTION BOX CONNECTED

Step 9. The IT Junction box enables you to read each individual load sensor's Millivolt, Millivolt/Volt or Weight Reading.

- The mV reading is a coarser reading than the mV/V or Weight. The mV reading is sufficient to balance the corners of your scale or vessel.
- These readings allow you to determine if the problem is in the instrument (internal) or in a load sensor(s) (external). The specification range for the Weight Controller is 0-15 mV. If you are getting a reading outside this range (15.5 mV, 3.1 mV/V Maximum or any negative values) the problem is exterior to the Instrument (most likely improper wiring). If you are getting a reading between 0-15 mV the reading is normal.

Step 10. To select the Millivolt readings for all the load sensors that are connected to the scale, press the up or down arrow buttons until the cursor is in front of the All Millivolt (mV).

Step 11. Press the Enter button. The Scale Millivolt per individual Scale Load Sensor display appears providing the readings for all the load cells that are connected to Scale 1. (See Fig. 7-24)

- To see the reading for Load Sensor #4 press the down arrow button. The Scale Millivolt display appears with LS4 displayed. (See Fig. 7-24 & 25)

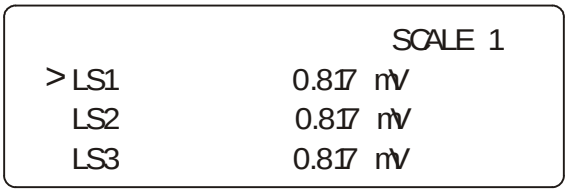


FIG. 7-24 SCALE 1/INDIVIDUAL MILLIVOLT DISPLAY 1

FIG. 7-25 SCALE 1/INDIVIDUAL MILLIVOLT DISPLAY 2

- If all the load sensor readings are 0.00 mV there is something wrong between the HI 3030 and the HI 215IT Junction Box or with the Junction Box itself. The cable is disconnected or something is wrong with the Junction Box such that it is not transmitting the Millivolt readings to the HI 3030 Weight Controller.
- If you do not get a reading for one or possibly two or more load sensors (LS3 for example reads 0.00 mV or the millivolt reading is either larger or smaller than it should be) and you know that the Load Sensors are connected to the Junction Box, the individual load sensor cable is disconnected from the junction box or the load sensor is malfunctioning.

- With this information you can quickly determine what the problem is and where it is located either from the Front Panel or Web Browser.
- If the Millivolt readings are not fine enough to determine the problem select the Millivolt/Volt readings.

Step 12. Press the Exit button to return to the Totals Display. (See Fig. 7-26)

Step 13. To read the Millivolt/Volt reading for finer troubleshooting, press the down arrow until the cursor is in front of the Millivolt/Volt (mV/V) reading for the selected scale. In our example we selected Scale #1. (See Fig. 7-26)

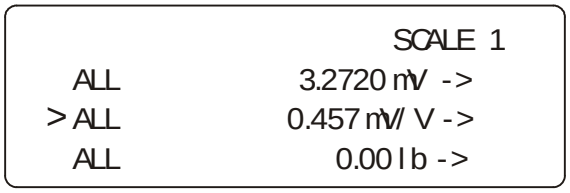


FIG. 7-26 SCALE #1 WITH TOTALS/MILLIVOLT/ VOLT SELECTED

Step 14. Press the Enter button. The Scale Millivolt/Volt for individual Scale Load Sensor display appears. (See Fig. 7-27)

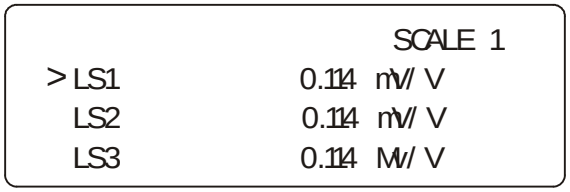


FIG. 7-27 SCALE 1/INDIVIDUAL MILLIVOLT/VOLT DISPLAY 1

- To see the reading for Load Sensor #4 press the down arrow button. The Scale Millivolt/Volt display appears with LS4 displayed. (See Fig. 7-28)

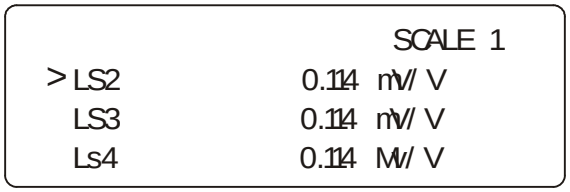


FIG. 7-28 SCALE 1/INDIVIDUAL MILLIVOLT/VOLT DISPLAY 2

- If all the load sensor readings are 0.00 mV/ V there is something wrong between the HI 3030 and the HI 215IT Junction Box or with the Junction Box itself. The cable is disconnected or something is wrong with the Junction Box such that it is not transmitting the Millivolt/Volt readings to the HI 3030 Weight Controller.
- If you do not get a reading for one or possibly two or more load sensors (LS3 for example reads 0.00 mV/V or the millivolt/ Volt reading is either larger or smaller than it should be) and you know that the Load Sensors are connected to the Junction Box, the individual load sensor cable is disconnected from the junction box or the load sensor is malfunctioning.
- With this information you can quickly determine what the problem is and where it is located either from the Front Panel or Web Browser.
- If the Millivolt/Volt readings are not fine enough to determine the problem select the Weight readings.

Step 15. Press the Exit button to return to the Totals Display. (See Fig. 7-29)

Step 16. To read the Weight reading for finer troubleshooting, press the down arrow until the cursor is in front of the Weight (lb, kg, gr, oz) reading for the selected scale. In our example we selected Scale #1. (See Fig. 7-29)

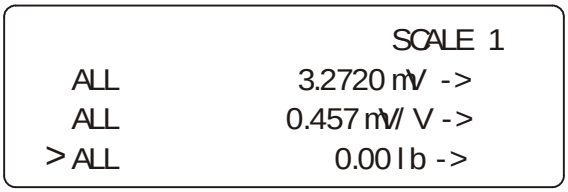


FIG. 7-29 SCALE #1 WITH TOTALS/WEIGHT (LB) SELECTED

Step 17. Press the Enter button. The Scale Weight for the individual Scale Load Sensor display appears. (See Fig. 7-30)

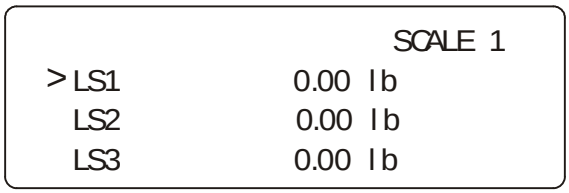


FIG. 7-30 SCALE 1/INDIVIDUAL WEIGHT DISPLAY 1

- To see the reading for Load Sensor #4 press the down arrow button. The Scale Millivolt/Volt display appears with LS4 displayed. (See Fig. 7-31)

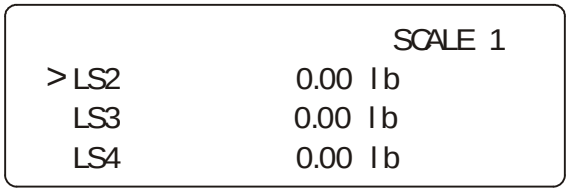


FIG. 7-31 SCALE 1/INDIVIDUAL WEIGHT DISPLAY 1

- If you do not get a reading from one of the load sensors, either the cable to the load sensor is disconnected or the load sensor is malfunctioning.
- If one of the load sensors is reading higher or lower than the other load sensors in your system and you know that you calibrated the instrument and cornered the scale, there is something wrong with the load sensor.
- If one of the load sensors is reading higher or lower than the other load sensors and you do not know if the scale has recently been calibrated, re-calibrate the scale then perform the Voltage and Weight test again.

Stability Test

The Stability Test switches a fixed signal into the analog to digital convertor, and calculates the mean squared variation from the average reading, using 100 samples.
The test passes if the mean squared variation is less than 5.0, and the average reading is between 30237 and 36955.

Step 1. Press the up or down arrow buttons until the cursor is in front of Stability Test. (See Fig.7-32)

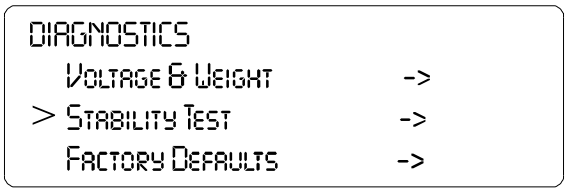


FIG. 7-32 DIAGNOSTICS DISPLAY/SELECTING STABILITY TEST

Step 2. Press the Enter button. The Information display appears “SYS. STABILITY TEST, PRESS ENTER TO START”. (See Fig. 7-33)

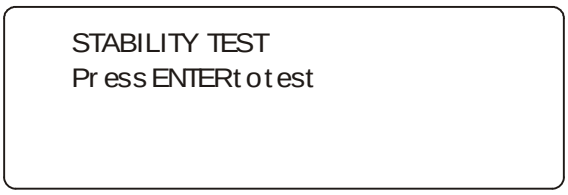


FIG. 7-33 STABILITY TEST DISPLAY

Step 3. Press the ENTER button to perform the stability test.

- Each channel that passes the Stability Test are displayed as PASS. (See Fig. 7-34) This means that the Mean Squared Variation is less than 5.0 and the average reading is between 30237 and 36955. In short the instrument is working fine.

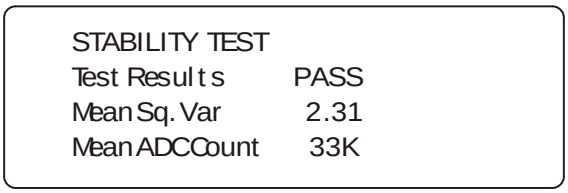


FIG. 7-34 SYSTEM STABILITY TEST DISPLAY/ PASS

- If the channel does not pass the Stability Test the FAIL display appears. This means that the Mean Squared Variation is greater than 5.0 and/or the average reading is not between 30237 and 36955. This test examines the internal electronics and not the load cells input signal.

1. Disconnect the power cord and reconnect the power cord to restart the instrument.
2. Repeat the Stability test.
3. If a channel Fails the Stability Test again, contact Hardy Instruments Inc., Technical Support for assistance.

Step 4. Press the Exit button to return to the Diagnostics display.

Factory Defaults

CAUTION: IF YOU CHOOSE FACTORY DEFAULTS ALL DATA WILL BE LOST! MAKE ABSOLUTELY SURE THAT THIS IS WHAT YOU WANT TO DO BEFORE CHOOSING THIS OPTION. DO NOT USE THIS FUNCTION IN AN EFFORT TO CORRECT ANY MALFUNCTIONS IN THE OPERATION OF THE INSTRUMENT.

Step 1. Press the up or down arrow buttons until the cursor is in front of Factory Defaults. (See Fig. 7-35)

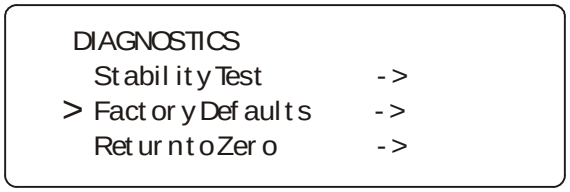


FIG. 7-35 DIAGNOSTICS DISPLAY/FACTORY DEFAULTS

- Resetting the Default Parameters is used when you want reset the instrument to all defaults when changing a scale or application to be sure that all parameters are set to a known working condition. Also used when the scale seems not to respond to any corrective action.
- It is required that the security access to this menu is High (HI).

Step 2. Press the Enter button. The Factory Defaults display appears. (See Fig. 7-36)

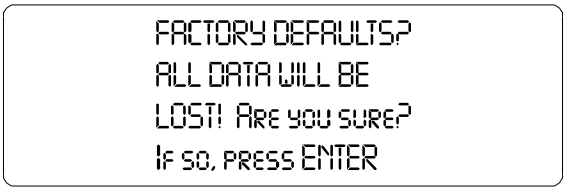


FIG. 7-36 FACTORY DEFAULTS DISPLAY

Step 3. Press the Exit button if you do not want to set the Factory Defaults. The Diagnostics display reappears.

Step 4. Press the Enter button if you want to set the Factory Defaults.

Step 5. If the password is not set for HI security a Security Violation appears. You will have to change your security level for your password to HI or find someone who has a HI security clearance to set the Factory Defaults. (See HI 3000 manual, Security Section for more instructions)

Step 6. A display appears telling you to Please Wait. (See Fig. 7-37)

Step 7. The Summary Display appears listing all the Channels. (See Fig. 7-38)

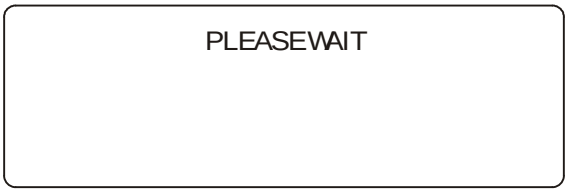


FIG. 7-37 PLEASE WAIT DISPLAY

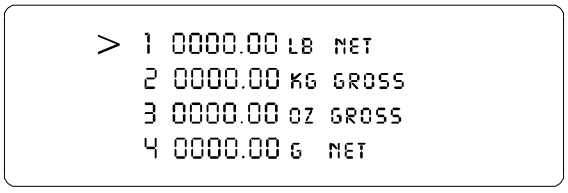


FIG. 7-38 SUMMARY DISPLAY

Step 8. You will have to go back into the Diagnostics section again to continue.

Return to Zero Test

The Return to Zero Test is used to determine whether the instrument can still zero a scale based on preset parameters. If you pass the Return to Zero Test you are within the sum of the preset Motion and Zero Tolerance settings. If you fail you are outside the sum of the preset Motion and Zero Tolerance settings. If you Fail the test there may be too much build up on the scale and you need to clean the scale or you have scale problems. You should do this test whenever you cannot zero the scale.

Step 1. Press the up or down arrow buttons until the cursor is in front of Return to Zero. (See Fig. 7-39)

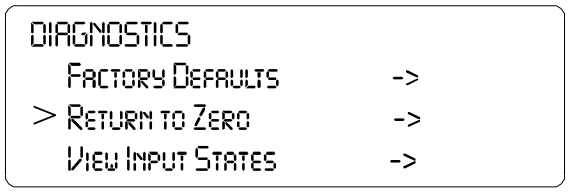


FIG. 7-39 DIAGNOSTICS DISPLAY/SELECTING RETURN TO ZERO TEST

Step 2. Press the Enter button. The Return to Zero Test display appears. (See Fig. 7-40)

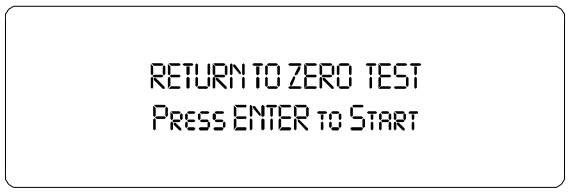


FIG. 7-40 RETURN TO ZERO TEST DISPLAY

Step 3. To perform the test press the Enter button. In a few seconds a display appears telling you if the instrument has passed or failed.

- If you Pass the Test the Pass display appears. (See Fig. 7-41)

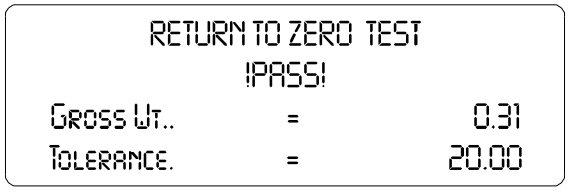


FIG. 7-41 RETURN TO ZERO TEST/PASS

- If instrument Fails the test the Fail display appears. (See Fig. 7-42) You may need to do the following:

  1. Check the scale for excess material.
  2. Check your Motion and Zero Tolerance settings. They might be set too low for your process.

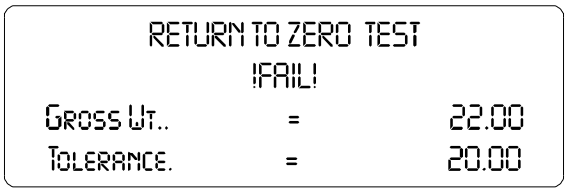


FIG. 7-42 RETURN TO ZERO/FAIL

Step 4. Press the Exit button to return to the Diagnostics display.

View Input States

The Input States display shows whether or not the instruments has any inputs activated. A 1 means the input is active and a 0 means it is not.

Step 1. Press the up or down arrow buttons until the cursor is in front of View Input States. (See Fig. 7-43)

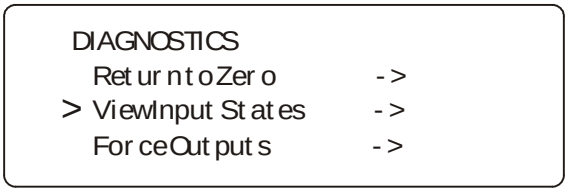


FIG. 7-43 DIAGNOSTICS/VIEW INPUT STATES

Step 2. Press the Enter button. The Input States display appears. (See Fig. 7-44)

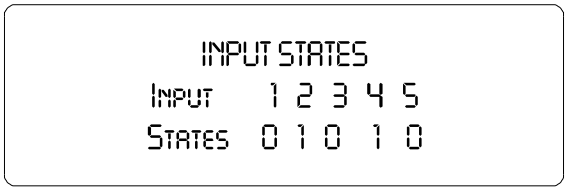


FIG. 7-44 INPUT STATES DISPLAY/INPUT 2 AND 4 ACTIVE

Step 3. Press the Exit button to return to the Diagnostics display.

Force Outputs

WARNING: FORCING THE OUTPUT RELAY MAY CAUSE DAMAGE OR PERSONAL INJURY. MAKE ABSOLUTELY SURE THAT YOU KNOW WHAT THE RELAY IS CONNECTED TO BEFORE ACTIVATING. IF INSECTARY DO A PHYSICAL CHECK

TO DETERMINE WHAT THE SELECTED RELAY IS CONNECTED TO BEFORE ACTIVATING.

The Force Outputs function individually activates each of the 4 Output relays in the instrument. Useful in pre-startup to determine that all the relays are connected to the correct auxiliary devices.

Step 1. Press the up or down arrow buttons until the cursor is in front of Force Outputs. (See Fig. 7-45)

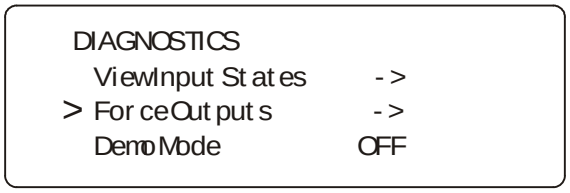


FIG. 7-45 DIAGNOSTICS DISPLAY/FORCE OUTPUTS

Step 2. Press the Enter button.
Step 3. The Output Relay display appears with the cursor in front of Output Relay #1. (See Fig. 7-46)

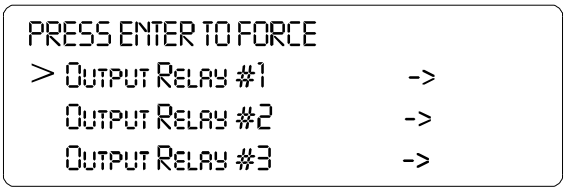


FIG. 7-46 OUTPUT RELAY DISPLAY/SELECTING OUTPUT RELAY #1

Step 4. To select another Output Relay, press the up or down arrow buttons until the cursor is in front of the Output Relay you want to force. (See Fig. 7-47)

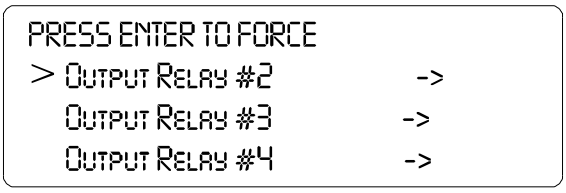


FIG. 7-47 OUTPUT RELAY DISPLAY/SELECTING OUTPUT RELAY #2

Step 5. Press the Enter button to activate the output relay you have chosen. The Output Relay Forced Closed display appears. (See Fig. 7-48)

- All the output relays on the instrument are Normally Open so activation will close the relay.

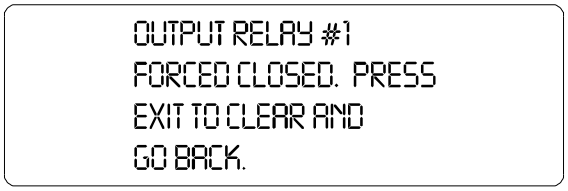


FIG. 7-48 OUTPUT RELAY #1 FORCED CLOSED DISPLAY

Step 6. Press the Exit button to return to the Output Relay Display.

- If you want to select another Output Relay do so now.
- If you do not want to select another Output Relay, press the Exit button to return to the Diagnostics display.

Step 7. Press the Exit button again to return to the Diagnostics display.
Step 8. Press the Exit button until you return to the Summary Display.

System Integrity Check and Fault Determination From the Web Browser

Diagnostics

Diagnostics is used to troubleshoot the Weight Controller. A complete Troubleshooting Guide is available in this Service Manual. What is important for Operational purposes is to be able to see the information about this instrument. Setting Default Settings is also useful to operators.

Using IT From the Web Browser

Step 1. From the Home Page click on Operation. (See Fig. 7-49) The Operation Choose One page appears. (See Fig. 7-50)

FIG. 7-49 HOME PAGE/SELECTING OPERATION

Step 2. Click on Diagnostics. (See Fig. 7-50) The Operation-Diagnostics Page appears with the four (4) scales listed. (See Fig. 7-51)

FIG. 7-50 OPERATION - CHOOSE ONE/SELECTING DIAGNOSTICS

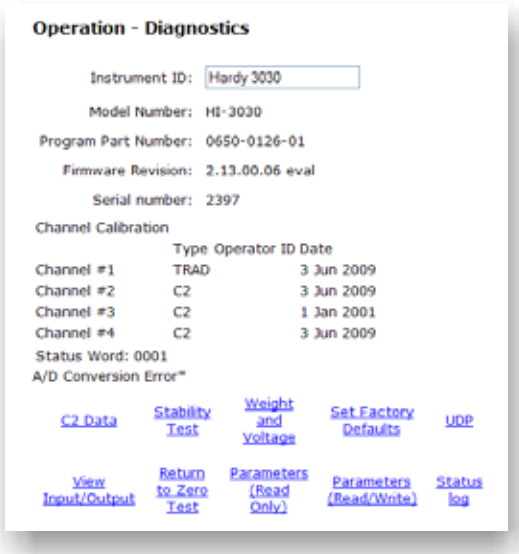


FIG. 7-51 OPERATION - DIAGNOSTICS

Step 3. Click on Weight and Voltage. (See Fig. 7-52) The Operation/Diagnostics - Weight & Voltage page appears with all four (4) channels listed. (See Fig. 7-52)

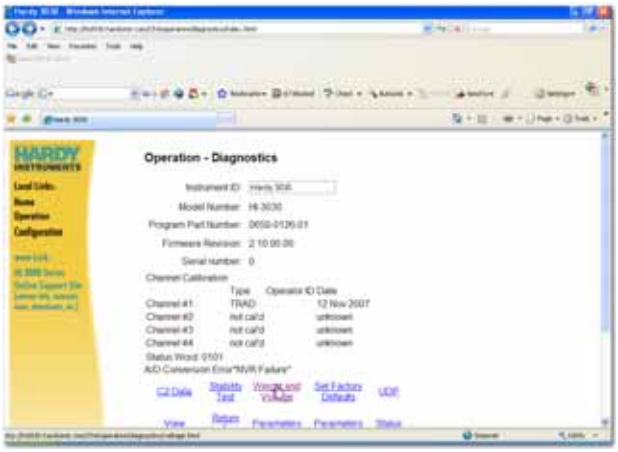


FIG. 7-52 OPERATION - DIAGNOSTICS/ SELECTING WEIGHT AND VOLTAGE

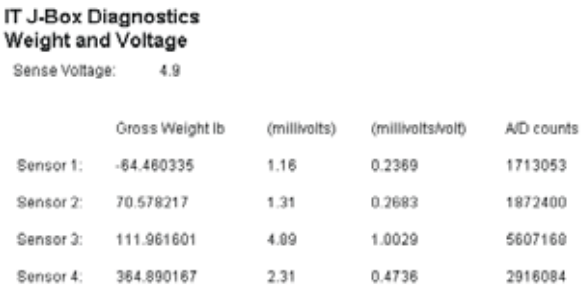
FIG. 7-53 OPERATION/DIAGNOSTICS - WEIGHT & VOLTAGE PAGE

Step 4. You will notice that the First Channel has a Test Channel #1 button. This means that this channel is connected to an HI 215IT Junction Box. The other three (3) channels have the load sensors connected directly to the HI 3030 and are not set for IT.

NOTE: Whichever channel is connected to an HI 215IT Junction Box will have a test button.

Step 5. Click on the Test button of the channel you want to test. In out example we selected the Test Channel #1 button. (See Fig. 7-54) The IT J-Box Diagnostics Weight and Voltage results appear.

NOTE: The values expressed here are for illustration purposes only. Your values will be different.



IT J-Box Diagnostics
Weight and Voltage

Sense Voltage: 4.9

	Gross Weight lb	(millivolts)	(millivolts/volt)	A/D counts
Sensor 1:	-64.460335	1.16	0.2369	1713053
Sensor 2:	70.578217	1.31	0.2683	1872400
Sensor 3:	111.961601	4.09	1.0029	5607169
Sensor 4:	364.890167	2.31	0.4736	2916084

FIG. 7-54 IT J-BOX DIAGNOSTICS WEIGHT AND VOLTAGE PAGE

NOTE: The IT Web page shows all the Weight and Voltage values at once. So if you want to save time use the Web Browser IT page for troubleshooting.

- The mV reading is a coarser reading than the mV/V or Weight readings. The mV reading is sufficient to balance the corners of your scale or vessel.
- These readings allow you to determine if the problem is in the instrument (internal) or in a load sensor(s) (external). The specification range for the Weight Controller is 0-15 mV. If you are getting a reading outside this range (15.5 mV, 3.1 mV/V Maximum or any negative values) the problem is exterior to the Instrument (most likely improper wiring). If you are getting a reading between 0-15 mV the reading is normal.

Step 6. Check the results:

- If all the load sensor readings are 0.00 there is something wrong between the HI 3030 and the HI 215IT Junction Box or with the Junction Box itself. The cable is disconnected or something is wrong with the Junction Box such that it is not transmitting the readings to the HI 3030 Weight Controller.
- If you do not get a reading for one or possibly two or more load sensors (Sensor 3 for example reads 0.00 or the reading is either larger or smaller than it should be) and you know that the Load Sensors are connected to the Junction Box, the individual load sensor cable is disconnected from the junction box or the load sensor is malfunctioning.

Step 7. With this information you can quickly determine what the problem is and where it is located either from the Front Panel or Web Browser.

Setting the Factory Defaults from the Web Browser

Step 1. Click on “Set Factory Defaults”. The Set Factory Defaults page appears. (See Fig. 7-55)

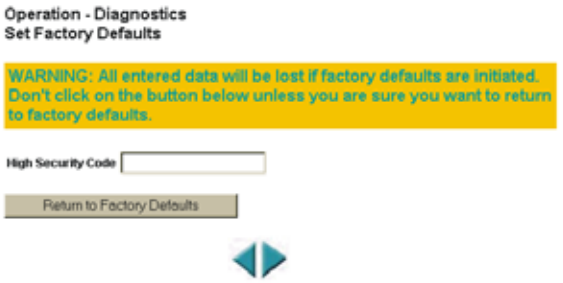

Operation - Diagnostics
Set Factory Defaults
WARNING: All entered data will be lost if factory defaults are initiated. Don't click on the button below unless you are sure you want to return to factory defaults.
High Security Code
Return to Factory Defaults

FIG. 7-55 SET FACTORY DEFAULTS

WARNING: ANY AND ALL DATA WILL BE LOST IF FACTORY DEFAULTS ARE INSTALLED. THIS, INCLUDES EVERY PARAMETER THAT WAS CHANGED FOR INGREDIENTS, IP ADDRESS, EVERYTHING. THE INSTRUMENT IS RETURNED TO THE CONDITION IT WAS RIGHT FROM THE FACTORY.

Step 2. Enter the High Security Code Number.
Step 3. Click on the Return to Factory Defaults button.
Step 4. The Confirmation Page appears.
Step 5. The page informs you that all Factory defaults have been set.
Step 6. Click on “Back” to return to the previous page. The previous page appears.

Step 7. Click on the left arrow to return to the Operation Diagnostics page.
Step 8. Click on Home to return to the Weight Controller Home Page.

Overview of Typical Load Cell System

1. The typical system consists of one or more load cells/points, a summing junction box, and an HI 3030 Weight Controller. (See Figure 7-56).

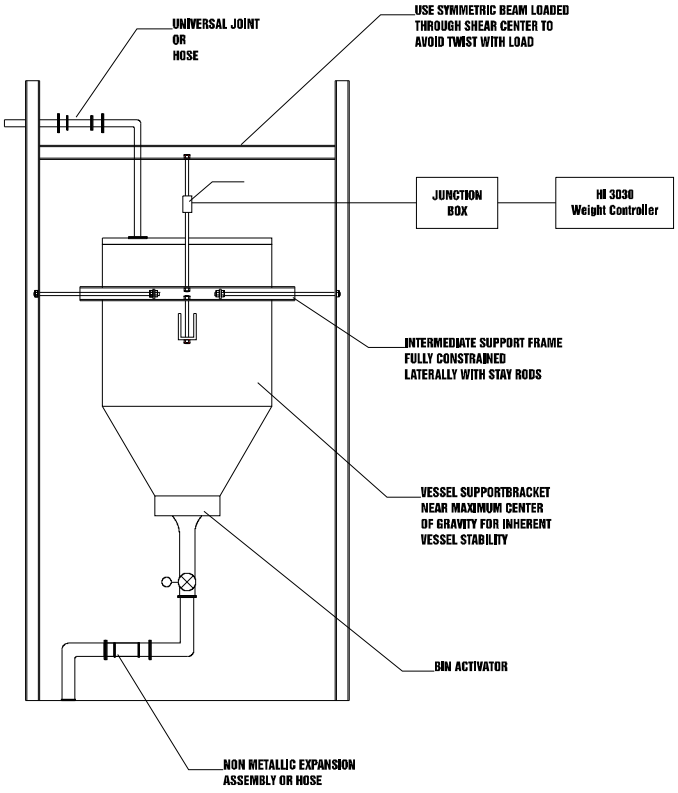


FIG. 7-56 TYPICAL LOAD CELL SYSTEM

2. Load Cell/Sensor/Point - is a strain gauge based force transducer, which generates an electrical signal proportional to the load applied to the scale. Load cells/points can be used any place a person needs to measure pressure, load, or torque. This can be accomplished by either Tension or Compression type load cells/points. The load cell/point takes as an input the 5 volts DC Excitation Voltage generated by the HI 3030, and depending upon how much weight is applied to the scale, generates a millivolt output (proportional to the weight, 0-10mv DC for 2mv/V load cells/points or 0-15mv DC for 3mv/V load cells/points).
3. Weight Controller - is part of the HI 3010 instrument which, among other functions, is used to power the load cell(s)/point(s), take the millivolt signal output from the load cell(s)/ point(s), and digitize, interpret, communicate and display the results as a weight indication.

Troubleshooting The Network Connections and Configuration with the "Ping" Tool

Step 1. The Ping Tool is used from the root directory of the PC. Get to the Root directory. The Root Directory is the “C:/” Prompt.

Step 2. If you do not know how to get to the Root Directory, check you Operating System User Guide or Manual for information on how to get to the root directory.

Selecting the module by number for Testing

NOTE: You can only ping from the PC you cannot ping from an instrument.

Step 1. Type PING <space>IP address of the instrument you want to test. For Example:

C:/PING 192.168.110.99

- In our example we used the default address for all HI 3000 Series Instruments. The IP address you are testing will be different.

Step 2. Press the Enter key on the PC.
Step 3. The PING utility starts sending out 56 signals and 64 signals should return if the unit is functioning correctly.

- If the instrument or network are configured incorrectly and cables are loose or not connected correctly, nothing prints out after the first line. Do the following:

  1. Check the Network cables and connectors to be sure they are tightly fastened and the correct cables for this application.
  2. Check the configuration to be sure that the instrument is configured correctly. (See Configuration IP Address in Chapter 6)
  3. Check the Ethernet card to be sure that is securely seated and that it is functioning correctly.

- If the unit is configured correctly and the Ethernet card is functioning correctly and the cables are the correct ones for this application and are securely fastened, 64 signals should be returned and the print out will reflect this fact.

NOTE: NOTE: The Ping utility continues to send out signals (pings) until you exit the Ping Tool.

- Simultaneously press the <Ctrl> key and the letter <C> key to stop the signals.

Exiting the Root Directory

Step 1. Type exit at the root directory prompt.
C:/exit
Step 2. Press the Enter key.

About Solid State Relays With Light Loads

There have been installations where solid state relays have been used and failed to shut off a solenoid or relay when de-energized. The actual problem comes from the internal snubbing network in parallel with the Silicon Controlled Rectifier (SCR) which does the actual switching. This network presents an impedance of 30K ohms, which means with 120 volts across, it will pass 4mA of AC current.

SCR SWITCHING LOAD CIRCUIT

The SCR itself presents no leakage current. Some solid state relay manufactures specify 20mA minimum load. This is based on the presumption a relay or solenoid will drop out with only 4mA through it, which is not always true. That may not be true. When switching a light load with a solid state relay across the line, you must look at the rated drop-out current of the load, and if it is less than 4mA it may not turn off. The solution is to put a loading resistor in parallel with the light load, to be sure leakage current is sufficiently shunted away from the coil.

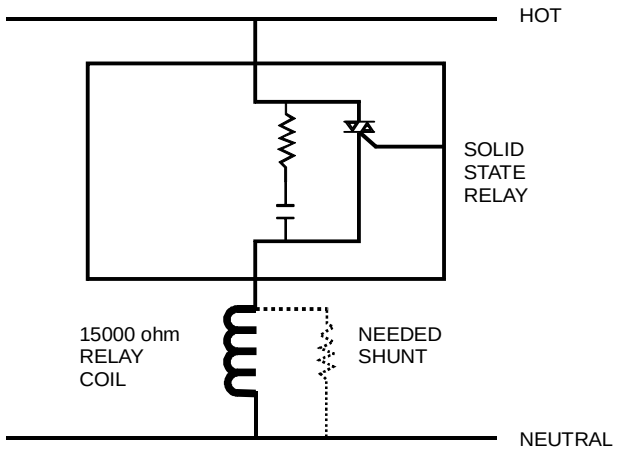


FIG. 7-57 SCR SWITCHING LOAD CIRCUIT

Assume a load like a relay with a coil of 15,000 ohms and of 5% of nominal drop-out. When the solid state relay is off, there will still be 1/3 of the line voltages across the relay, so it will not drop out. For the relay to have 5% of the line across it, it and a parallel shunt resistor must be 20 times less resistance than the 30K snubbing network, or 1.5K ohms. Use less than a 1.67K ohm parallel resistor and now total load is below 1.5K ohm or 80mA.

General Policies and Information

With over 70 years of industrial weighing experience and products in the field, Hardy Instruments continues to design, manufacture, install and support Hardy products worldwide. The following paragraphs describe Hardy's customer support services and equipment warranty.

NOTE: Before returning any product to Hardy Instruments, call the Technical Service Department listed below for a Return Authorization Number. Have your company name, address, telephone, equipment model number, S/N, and a brief description of the problem ready to give to him. In addition, please have Appendix A completed and ready to FAX to us before calling.

FOR FURTHER INFORMATION CONTACT:

Technical Service Manager
Hardy Process Solutions, Inc.
9440 Carroll Park Drive San Diego, CA 92121
Telephone: (858) 278-2900
FAX: (858) 278-6700
Web Site: http://www.hardysolutions.com

E-Mail: support@hardysolutions.com

Ordering Replacement Parts

Contact the Hardy Instruments Sales Department to order replacement parts and option boards. Have your equipment model number and serial number ready.

System Support

Technical Service is provided as follows:

- New system start-up: Ensure that the installation is checked and correct; instruments are calibrated, and operators trained.

1. Service: Engineers are trained and qualified to provide on-site installation, calibration, and maintenance.
2. On-site training: A Hardy Support Representative can be scheduled to train your operations and maintenance personnel. This can be as simple as basic load cell theory or as complete as troubleshooting techniques which allow you to service your equipment.

Warranty

A warranty problem may be handled by returning the product to the factory for repair or replacement under warranty.

- The Last Cal Type will tell you what Calibration was done on the instrument. This is important when you are not getting the readings you configured for the instrument.

DICTIONARY OF MAPPING SYMBOLS

Map Dictionary:

CMD0 - Specifies input and output locations for the command interface

DI - DeviceNet Input Table, as bits. DeviceNet tables are 125 words (16 bit) long.
DO - DeviceNet Output Table, as bits
DFI - DeviceNet Input, regarded as floats
DFO - DeviceNet Output, regarded as floats
DSI - DeviceNet Input, regarded as 16 bit integers
DSO - DeviceNet Output, regarded as 16 bit integers
DII - DeviceNet Input, regarded as 32 bit integers
DIO - DeviceNet Output, regarded as 32 bit integers
DTO - DeviceNet Output, regarded as text
DTI - DeviceNet Input, regarded as text

HI - Hardy Input Table

- HI0.0 - HI0.4 = digital inputs
- HI1.X = status bits

HI1.0 = A/D error
HI1.1 = A/D failure
HI1.5 = Real time clock failure
HI1.6 = Motion
HI1.8 = NVR Failure
HI1.9 = Infrared Failure
HI2.0 = Setpoint 1 output
HI2.1 = Setpoint 2 output
HI2.2 = Setpoint 3 output
HI2.3 = Setpoint 4 output
HI2.4 = Setpoint 5 output
HI2.5 = Setpoint 6 output
HI2.6 = Setpoint 7 output
HI2.7 = Setpoint 8 output
HI2.8 = Setpoint 9 output
HI2.9 = Setpoint 10 output
HI2.10 = Setpoint 11 output
HI2.11 = Setpoint 12 output
HI2.12 = Scale 1 in Motion
HI2.13 = Scale 2 in Motion
HI2.14 = Scale 3 in Motion
HI2.15 = Scale 4 in Motion

HSI - Hardy Input Table (Word)

HSI1 = Instrument Status Word
HSI2 = Setpoint Output Word
HSI3 = Command Status Word, Chan 1. This 16-bit word holds the result status of mapped commands.
HSI3.15 = Command Status Data Valid. This bit is set when the rest of the status bits are valid.
HSI4 = Command Status Word, Chan 2. This 16-bit word holds the result status of mapped commands.
HSI4.15 = Command Status Data Valid. This bit is set when the rest of the status bits are valid.
HSI5 = Command Status Word, Chan 3. This 16-bit word holds the result status of mapped commands.
HSI5.15 = Command Status Data Valid. This bit is set when the rest of the status bits are valid.
HSI6 = Command Status Word, Chan 4. This 16-bit word holds the result status of mapped commands.
HSI6.15 = Command Status Data Valid. This bit is set when the rest of the status bits are valid.
HSI7 = Watchdog Word. Each bit represents the corresponding node(bit0=Node0 etc.) sending data. Five seconds after the last data packet arrives form any node, its bit is set to zero.
HSI8,HSI9,HSI10,HSI11 - Status word for A/D channels 1-4
HSIX.0 = A/D error
HSIX.1 = A/D failure
HSIX.6 = Motion

HO - Hardy Output Table

HO0.0-HO0.3 = Output Relay 1-4
HO0.7 = Software LED (on back of unit)
HO1.0-HO1.3 = Tare Channel 1-4
HO1.4-HO1.7 = Zero Channel 1-4
HO1.12-HO1.15 = Print Channel 1-4
HO2.0-HO2.3 = C2 Calibrate Chan 1-4
HO2.4-HO2.7 = Trad Cal Low Ch 1-4
HO2.8-HO2.11 = Trad Cal High Ch 1-4
HO3.0-HO3.9 = Send Custom Email 0-9

HFI - Hardy Float Input Table

HFI4-7 = gross weight on chan 1-4
HFI8-11 = net weight on chan 1-4
HFI12-15 = peak weight on chan 1-4
HFI16-19 = Rate of Change on channels 1-4

HFO - Hardy Float Output Table

HFO[0- 7] - 8 user defined floating point scratchpad variables, saved in non-volatile RAM
HFO9-20 - Setpoint 1-12 input
HFO21-24 - Tare Wt ch 1-4
HFO25-28 - Motion Tolerance ch 1-4
HFO29-32 - Zero Tolerance ch 1-4
HFO33-36 - AutoZero Tolerance ch 1-4
HFO37-40 - Capacity ch 1-4
HFO41-44 - Cal Low Wt ch 1-4
HFO45-48 - Span Wt ch 1-4

HFO49-60 - Setpoint 1-12 Target Wt
HFO61-72 - Setpoint 1-12 Preact Wt
HFO73-84 - Setpoint 1-12 Deadband Wt
HFO85-HFO88 - Analog Output Card, Slot 0
HFO89-HFO92 - Analog Output Card, Slot 1

HSO - Hardy Short Output table. A table of 16 bit integers.

HSO0 Setpoint and Motion Word
HSO1-4 Unit of Measure Ch 1-4
HSO5-8 Decimal Point Ch 1-4
HSO9-12 Grad Size Ch 1-4
HSO13-16 WaverSaver Ch 1-4
HSO17-20 Averages Ch 1-4
HSO21-24 Use Auto Zero Ch 1-4
HSO25-28 Zero Reminder Ch 1-4
HSO29-32 Tare Reminder Ch 1-4
HSO33-36 Channel 1-4 On
HSO37 AutoPrint On
HSO38 IR Enabled
HSO39 Printer Baud
HSO40 Printer Parity
HSO41 Printer Data Bits
HSO42 DeviceNet Baud
HSO43 DeviceNet Node

HSO44 RIO Baud
HSO45 RIO Address
HSO46 RIO Rack Size
HSO47 RIO Quarter
HSO48 RIO Last Quarter
HSO49 ControlNet Address
HSO50 Profibus Node Number
HSO51 Profibus Out Size
HSO52 Profibus In Size
HSO53 Setup Menu Security
HSO54 Calibration Menu Security
HSO55 Options Menu Security
HSO56 Mapping Menu Security
HSO57 Medium Level Password
HSO58 High Level Password

HSO59-62 Calibration Type Ch 1-4
HSO67-70 Calibration Month Ch 1-4
HSO71-74 Calibration Day Ch 1-4
HSO75-78 Calibration Hour Ch 1-4
HSO79-82 Calibration Minute Ch 1-4
HSO83-86 Calibration Second Ch 1-4

HTO - Hardy Text Output table.

HTO0 Operator ID
HTO1 Instrument ID
HTO2-HTO5 Channel 1-4 Name
HTO6-HTO15 Custom Text 0-9

HTI - Hardy Text Input table.

HTI0-HTI3 Calibrator ID Ch 1-4
HTI4 Model Number
HTI5 Program Part Number
HTI6 Firmware Revision

HII - Hardy Integer Input table.

HII0 IP Address
HII1 IP Mask Address
HII2 IP Gateway Address
HII3 IP DNS Address
HII4 Serial Number

EO, EFO, ESO, EIO, ETO- Hardy Control Link Output tables

EO = Hardy Control Link output, addressed as bits
EFO = Hardy Control Link output, addressed as floats
ESO = Hardy Control Link output, addressed as 16 bit integers
EIO = Hardy Control Link output, addressed as 32 bit integers
ETO = Hardy Control Link output, addressed as text

0I, 0FI, 0SI, 0SO, 0II, 0IO, 0TI, 0TO- Hardy Control Link Input tables, from Node 0

0I = Hardy Control Link input from Node 0, addressed as bits
0FI = Hardy Control Link input from Node 0, addressed as floats
0SI = Hardy Control Link input from Node 0, addressed as 16 bit integers
0II = Hardy Control Link input from Node 0, addressed as 32 bit integers
0TI = Hardy Control Link input from Node 0, addressed as text
1I, 1FI, 1SI, 1SO, 1II, 1IO, 1TI, 1TO- Hardy Control Link Input tables, from Node 1
2I, 2FI, 2SI, 2SO, 2II, 2IO, 2TI, 2TO- Hardy Control Link Input tables, from Node 2
...
9I, 9FI, 9SI, 9SO, 9II, 9IO, 9TI, 9TO- Hardy Control Link Input tables, from Node 9
UI, UFI, USI, USO, UII, UIO, UTI, UTO- Hardy Control Link Input tables, from Node 10
VI, VFI, VSI, VSO, VII, VIO, VTI, VTO- Hardy Control Link Input tables, from Node 11
...
ZI, ZFI, ZSI, ZSO, ZII, ZIO, ZTI, ZTO- Hardy Control Link Input tables, from Node 15

RI, RO, RFI, RFO, RSI, RSO, RII, RIO, RTI, RTO - RIO tables (used if you have an RIO option card)

RI, RO = RIO input/output, addressed as bits
RFI, RFO = RIO input/output, addressed as floats
RSI, RSO = RIO input/output, addressed as 16 bit integers
RII, RIO = RIO input/output, addressed as 32 bit integers
RTI, RTO = RIO input/output, addressed as text

CI, CO, CFI, CFO, CSI, CSO, CII, CIO, CTI, CTO - Communications Network tables (used if you have a ControlNet, EtherNet/IP or Profibus option card)

CI, CO = Communication Network input/output, addressed as bits
CFI, CFO = Communication Network input/output, addressed as floats
CSI, CSO = Communication Network input/output, addressed as 16 bit integers
CII, CIO = Communication Network input/output, addressed as 32 bit integers
CTI, CTO = Communication Network input/output, addressed as text

MI, MO, MFI, MFO, MSI, MSO, MII, MIO, MTI, MTO - Modbus tables (used if you have Modbus)

MI, MO = Modbus input/output, addressed as bits
MFI, MFO = Modbus input/output, addressed as floats
MSI, MSO = Modbus input/output, addressed as 16 bit integers
MII, MIO = Modbus input/output, addressed as 32 bit integers
MTI, MTO = Modbus input/output, addressed as text

HVO The members in this table are displayed in the configured units (lb, kg, oz, g)

HVO0-3 = Zero Tolerance, channels 1-4
HVO4-7 = Motion Tolerance, channels 1-4
HVO8-11 = Auto Zero Tolerance, channels 1-4
HVO12-15 = Scale Capacity, channels 1-4
HVO16-19 = Calibration reference weight, channels 1-4
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HVO24-27 = peak weight, channels 1-4
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